DOCUMENT RESUME

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TITLE	Military Curricula for Vocational & Technical Education. Entomology Specialist 1-5.
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AVAILABLE FROM	The National Center Clearinghouse, Dr. Shirley Chase, The National Center for Research in Vocational Education, The Ohio State University, 1960 Kenny Rd., Columbus, OH 43210 ("Pictorial Keys" only: write for price).
EDRS PRICE	MF01/PC14 Plus Postage.
DESCRIPTORS	*Agricultural Education; Agricultural Occupations; Agriculture; Behavioral Objectives; Course Descriptions; Curriculum Guides; Ecology; *Entomology; *Equipment Maintenance; *Equipment Utilization; Herbicides; Insecticides; Learning Activities; Lesson Plans; *Pesticides; Postsecondary Education; Rats; Safety; Secondary Education; Vocational Education; Zoology
IDENTIFIERS	Military Curriculum Project; *Pest Control; Pests

ABSTRACT

This plan of instruction, lesson plans, and student study guides and workbooks for a secondary-postsecondary level course for an entomology specialist are one of a number of military-developed curriculum packages selected for adaptation to vocational instruction and curriculum development in a civilian setting. The course includes training on procedures for insect and rodent control, collection and identification of specimens, determination of control measures, identification and use of treatment solutions, and operation and maintenance of insecticide dispersal equipment. Three blocks of instruction cover 155 hours: (1) Entomology Fundamentals, Pesticides, and Equipment (11 lessons, 49 hours); (2) Control of Medically Important Pests (9 lessons, 58 hours); and (3) Control of Economically Important Pests (7 lessons, 48 hours). A Specialty Training Standard for student evaluation is provided. The plan of instruction details the units of instruction, objectives, duration of lessons, and support materials needed. A study guide and a workbook are provided for each block. These materials contain objectives, reading assignments, and review exercises. Military manuals, commercial texts, and audiovisuals are recommended, but not provided. A pictorial reference ("Pictorial Keys") on insects is available from the National Center Clearinghouse--see availability statement. (YLB)

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ED198374

U.S. DEPARTMENT OF HEALTH,
EDUCATION & WELFARE
NATIONAL INSTITUTE OF
EDUCATION

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This military technical training course has been selected and adapted by The Center for Vocational Education for "Trial Implementation of a Model System to Provide Military Curriculum Materials for Use in Vocational and Technical Education," a project sponsored by the Bureau of Occupational and Adult Education, U.S. Department of Health, Education, and Welfare.

MILITARY CURRICULUM MATERIALS

The military-developed curriculum materials in this course package were selected by the National Center for Research in Vocational Education Military Curriculum Project for dissemination to the six regional Curriculum Coordination Centers and other instructional materials agencies. The purpose of disseminating these courses was to make curriculum materials developed by the military more accessible to vocational educators in the civilian setting.

The course materials were acquired, evaluated by project staff and practitioners in the field, and prepared for dissemination. Materials which were specific to the military were deleted, copyrighted materials were either omitted or approval for their use was obtained. These course packages contain curriculum resource materials which can be adapted to support vocational instruction and curriculum development.

The National Center Mission Statement

The National Center for Research in Vocational Education's mission is to increase the ability of diverse agencies, institutions, and organizations to solve educational problems relating to individual career planning, preparation, and progression. The National Center fulfills its mission by:

- Generating knowledge through research
- Developing educational programs and products
- Evaluating individual program needs and outcomes
- Installing educational programs and products
- Operating information systems and services
- Conducting leadership development and training programs

FOR FURTHER INFORMATION ABOUT
Military Curriculum Materials
WRITE OR CALL

Program Information Office
The National Center for Research in Vocational Education
The Ohio State University
1960 Kenny Road, Columbus, Ohio 43210
Telephone: 614/486-3655 or Toll Free 800/848-4815 within the continental U.S. (except Ohio)

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Military Curriculum Materials for Vocational and Technical Education

Information and Field Services Division

The National Center for Research in Vocational Education

Military Curriculum Materials Dissemination Is . . .

an activity to increase the accessibility of military-developed curriculum materials to vocational and technical educators.

This project, funded by the U.S. Office of Education, includes the identification and acquisition of curriculum materials in print form from the Coast Guard, Air Force, Army, Marine Corps and Navy.

Access to military curriculum materials is provided through a "Joint Memorandum of Understanding" between the U.S. Office of Education and the Department of Defense.

The acquired materials are reviewed by staff and subject matter specialists, and courses deemed applicable to vocational and technical education are selected for dissemination.

The National Center for Research in Vocational Education is the U.S. Office of Education's designated representative to acquire the materials and conduct the project activities.

Project Staff:

Wesley E. Budke, Ph.D., Director
National Center Clearinghouse

Shirley A. Chase, Ph.D.
Project Director

What Materials Are Available?

One hundred twenty courses on microfiche (thirteen in paper form) and descriptions of each have been provided to the vocational Curriculum Coordination Centers and other instructional materials agencies for dissemination.

Course materials include programmed instruction, curriculum outlines, instructor guides, student workbooks and technical manuals.

The 120 courses represent the following sixteen vocational subject areas:

- Agriculture
- Aviation
- Building & Construction Trades
- Clerical Occupations
- Communications
- Drafting
- Electronics
- Engine Mechanics
- Food Service
- Health
- Heating & Air Conditioning
- Machine Shop
- Management & Supervision
- Meteorology & Navigation
- Photography
- Public Service

The number of courses and the subject areas represented will expand as additional materials with application to vocational and technical education are identified and selected for dissemination.

How Can These Materials Be Obtained?

Contact the Curriculum Coordination Center in your region for information on obtaining materials (e.g., availability and cost). They will respond to your request directly or refer you to an instructional materials agency closer to you.

CURRICULUM COORDINATION CENTERS

EAST CENTRAL
Rebecca S. Douglass
Director
100 North First Street
Springfield, IL 62777
217/782-0759

NORTHWEST
William Daniels
Director
Building 17
Airdustrial Park
Olympia, WA 98504
206/753-0879

MIDWEST
Robert Patton
Director
1515 West Sixth Ave.
Stillwater, OK 74704
405/377-2000

SOUTHEAST
James F. Shill, Ph.D.
Director
Mississippi State University
Drawer DX
Mississippi State, MS 39762
601/325-2510

NORTHEAST
Joseph F. Kelly, Ph.D.
Director
225 West State Street
Trenton, NJ 08625
609/292-6562

WESTERN
Lawrence F. H. Zane, Ph.D.
Director
1776 University Ave.
Honolulu, HI 96822
808/948-7834

ENTOMOLOGY SPECIALIST

Classroom Course

1-5

Developed by:
United States Air Force

Development and Review Dates:
May 15, 1975

D.O.T. No.:

Occupational Area:
Agriculture

Target Audiences:
Grades 11-adult

Print Pages:
367

Cost:
$7.50

Availability:
Military Curriculum Project, The Center for Vocational Education, 1960 Kenny Rd., Columbus, OH 43210

Contents:	Type of Materials: Lesson Plans:	Programmed Text:	Student Workbook:	Handouts:	Text Materials:	Audio-Visuals:	Instructional Design: Performance Objectives:	Tests:	Review Exercises:	Additional Materials Required:	Type of Instruction: Group Instruction:	Individualized:
			No. of pages									
Block I – *Entomology Fundamentals, Pesticides, and Equipment*	●		38		●	*	●	*		*	●	
Block II – *Control of Medically Important Pests*	●		42		●	*	●	*		*	●	
Block III – *Control of Economically Important Pests*	●		62		●	*	●	*		*	●	

* Materials are recommended but not provided.

THE CENTER FOR VOCATIONAL EDUCATION
THE OHIO STATE UNIVERSITY

Expires July 1, 1978

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Course Description:

This course includes training on procedures for insect and rodent control, collection and identification of specimens, determination of control measures, identification and use of treatment solutions, and operation and maintenance of insecticide dispersal equipment. The course consists of three blocks of instruction covering 155 hours.

Block I — *Entomology Fundamentals, Pesticides, and Equipment* contains eleven lessons covering 49 hours of instruction. The first lesson on orientation, the entomology career field and publications was delted. The lesson topics and respective hours follow:

Basic Principles of Pest Control (2 hours)
Sanitation in the Control of Pests (1 hour)
Field Ecology (6 hours)
Epidemiology of Vector-Borne Diseases (4 hours)
Pesticide Classification and Characteristics (6 hours)
Pesticide Safety (4 hours)
Safe Disposal of Pesticides (1 hour)
Chemical Laboratory and Storage Facility Maintenance (3 hours)
Hand-Powered Dispersal Equipment (20 hours)
Selection of Proper Pest Control Methods (2 hours)

Block II — *Control of Medically Important Pests* has nine lessons covering 58 hours of instruction.

Pesticide Formulation Calculations (18 hours)
Systematic Biology (2 hours)
General Biology of the Arthropods (2 hours)
Venomous Animals (2 hours)
Mosquitoes (8 hours)
Flies (8 hours)
Ectoparasites (8 hours)
Domestic Rodents (6 hours)
Field Rodents and Other Vertebrates (4 hours)

Block III — *Control of Economically Important Pests* contains seven lessons covering 48 hours of instruction. Four lessons dealing with laboratory maintenance, resource management, communications security, and surveys of treated areas were deleted because they discussed military procedures and military forms.

Fumigation Techniques (6 hours)
Stored Product Pests (6 hours)
Household Pests (8 hours)
Fumigation Clearance Techniques (4 hours)
Structural Pests (12 hours)
Horticultural Pests (6 hours)
Vegetation Control (6 hours)

This course contains both teacher and student materials. Printed instructor materials include a course chart; a Specialty Training Standard for student evaluation; lesson plans; and a plan of instruction detailing the units of instruction, objectives, duration of the lessons, and support materials needed. Student materials include a study guide and a workbook for each block plus a pictoral reference on insects. These materials contain objectives, reading assignments, and review exercises.

Several additional military manuals and commercially produced texts were recommended as references. Thirteen films are recommended for use with this course, but are not provided. This course can be used in a large group situation or adapted for individual study in entomology, agriculture, and ecology courses.

ENTOMOLOGY SPECIALIST

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Block II
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Block III
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Pictorial Keys to Some Arthropods and Mammals of Public Health Importance Page 291

CDC Key to Common Classes and Orders of Arthropods of Public Health Importance Page 359

PLAN OF INSTRUCTION

(Technical Training)

ENTOMOLOGY SPECIALIST

AIR TRAINING COMMAND

SHEPPARD TECHNICAL TRAINING CENTER

15 May 1975 - Effective 6 June 1975 with class 750606

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POI 3ABR56630

LIST OF CURRENT PAGES

This POI consists of 51 current pages issued as follows:

Page No.	Issue
Title	Original
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Annex (4 pages)	27 June 73

DISTRIBUTION: ATC/TTMS-1, AULD-1, SGPM-1, TCE-100, TTOT-1, TTOX-1, TTOR-1, TTE-1, CCAF/AY-2

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COURSE CHART

NUMBER 3ABR56630	PDS CODE AJ4	DATE 19 May 1975
COURSE TITLE Entomology Specialist		
ATC OPR AND APPROVAL DATE TTMS, 9 March 1965	CENTER OPR Sheppard/TTOXU	SUPERSEDES COURSE CHART 3ABR56630, 17 April 1973
DEPARTMENT OPR Department of Civil Engineering Training		APPLICABLE TRAINING STANDARD STS 566X0, 7 Nov 1974
LOCATION OF TRAINING Sheppard AFB TX 76311		COURSE SECURITY CLASSIFICATION UNCLASSIFIED
INSTRUCTIONAL DESIGN Group/Lock Step		TARGET READING GRADE LEVEL FOR PREPARATION OF TRAINING LITERATURE 9.5

LENGTH OF TRAINING (6 Weeks, 0 Days)

		Hours
Technical Training		214
Classroom/Laboratory (C/L)	180	
Complementary Technical Training (CTT)	34	
Related Training		26
Standard Traffic Safety, Course I (AFR 50-24)	12	
Local Conditions Course, Course II (AFR 50-24)	2	
Commander's Calls/Briefings	2	
End of Course Appointments; Predeparture Safety Briefing (ATCM 127-1)	10	
TOTAL		240

REMARKS

Effective Date: 6 June 1975 with class 750606.

TABLE I - MAJOR ITEMS OF EQUIPMENT

Sprayer, Portable
Mist-Dust Blower, Trailer-Mounted
Mist-Dust Blower, Back-Pack
Pump, Termite, w/Spray Nozzle, Sub-Slab Injector and Hoses
Kit, Fumigation, Portable
Sprayer, Hydraulic, Trailer-Mounted
Truck, Cargo, Utility, 2 Dr, 1/2 Ton
Truck, Stake and Platform, 1-1/2 Ton
Aerosol Generator, Mechanical, Vehicle-Mounted
Aerosol Generator, Thermal, Vehicle-Mounted
Microscope, Stereoscopic
Lab Tables
Cabinet, Specimen Display

ATC FORM DEC 74 449 REPLACES PREVIOUS EDITIONS AND ATC FORM 449B, NOV 72

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COURSE CHART – TABLE II – TRAINING CONTENT 3ABR56630

NOTE: Include time spent on technical training (TT) (classroom/laboratory (C/L) and complementary technical training (CTT)) and related training (RT). Exclude time spent on individual assistance (remedial instruction). A single entry of time shown for a unit is C/L time. When a double entry is shown, the second entry is CTT time.

HRS PER DAY WK OF TNG	1 2 3 4 5 6	7 8
1 2	Course Material - UNCLASSIFIED 66 Hours TT BLOCK I - Entomology Fundamentals, Pesticides, and Equipment Orientation to Course, Career Field, and Entomology Publications (3 hrs); Basic Principles of Pest Control (2 hrs); Sanitation in the Control of Pests (1 hr); Field Ecology (6 hrs); Epidemiology of Vector-Borne Diseases (4 hrs); Pesticide Classification and Characteristics (6 hrs); Pesticide Safety (4 hrs); Safe Disposal of Pesticides (1 hr); Chemical Laboratory and Storage Facility Maintenance (3 hrs); Hand-Powered Dispersal Equipment (6 hrs); Power-Driven Dispersal Equipment (20 hrs); Selection of Proper Pest Control Methods (2 hrs); Measurement Test and Test Critique (2 hrs). (Safety as Applicable) 60 Hours C/L	14 Hours RT 6 Hours CTT
3 4	Course Material - UNCLASSIFIED 78 Hours TT Block II - Control of Medically Important Pests Pesticide Formulation Calculations (18 hrs); Systematic Biology (2 hrs); General Biology of the Arthropods (2 hrs); Venomous Animals (2 hrs); Mosquitoes (8 hrs); Flies (8 hrs); Ectoparasites (8 hrs); Domestic Rodents (6 hrs); Field Rodents and Other Vertebrates (4 hrs); Measurement Test and Test Critique (2 hrs). (Safety as Applicable) 60 Hours C/L	18 Hours CTT 2 Hours RT

COURSE CHART – TABLE II – TRAINING CONTENT 3ABR56630

NOTE: This table documents the 8–hour training day. It shows time spent on technical training and related training identified on page 1 but does not show time spent on individual assistance offered the student outside the 8–hour day.

WK OF TNG / HRS PER DAY	1 2 3 4 5 6	7 8
5 6	Course Material - UNCLASSIFIED BLOCK III - Control of Economically Important Pests — 70 Hours TT Fumigation Techniques (6 hrs); Stored Products Pests (6 hrs); Household Pests (8 hrs); Fumigation Clearance Techniques (4 hrs); Structural Pests (12 hrs); Horticultural Pests (6 hrs); Vegetation Control (6 hrs); Specimen Laboratory Maintenance (2 hrs); Project and Resource Management (4 hrs); Communication Security (1 hr); Survey of Treated Areas (1 hr); Measurement Test and Test Critique (2 hrs); Course Critique, and Graduation (2 hrs). (Safety as Applicable) 60 Hours C/L	10 Hours CTT 10 Hours RT

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DEPARTMENT OF THE AIR FORCE
USAF School of Applied Aerospace Sciences (ATC)
Sheppard Air Force Base, Texas 76311

PLAN OF INSTRUCTION 3ABR56630
(PDS Code AJ4)
15 May 1975

FOREWORD

1. **PURPOSE.** This plan of instruction prescribes the qualitative requirements for Course Number 3ABR56630, Entomology Specialist, in terms of criterion objectives presented by units/modules of instruction and shows duration, correlation with training standard, support materials, and instructional guidance. It was developed under the provision of ATCR 50-5, Instructional System Development, and ATCR 52-7, Plans of Instruction.

2. **COURSE DESCRIPTION.** This technical training course trains airmen to perform duties prescribed in AFM 39-1 for the Entomology Specialist, AFSC 56630. Training includes procedures for insect and rodent control, collection and identification of specimen, determination of control measures, identification and use of treatment solutions, and operation and maintenance of insecticide dispersal equipment for control of pests. The course also includes training in entomology safety, publications, and records. In addition, related training is provided on drivers education, supplemental military training, troop information program, commander's calls/breifings, etc.

3. **EQUIPMENT ALLOWANCE AND AUTHORIZATION.** Training equipment required to conduct this course is listed in Equipment Authorization Inventory Data Number 3ABR566300000. Training equipment authorizations for this course are based on the following Tables of Allowance:

TA 008	Civil Engineer Equipment
TA 010	Vehicles
TA 016	Personal and Special Purpose Clothing and Equipment, USAF (Personal)
TA 483	Civil Engineering Water, Sewage Disposal Treatment, Potable Water Analysis and Pest Control

NOTE: Group size is shown in parentheses after equipment listed in column 3 of numbered pages of this POI.

4. **MULTIPLE INSTRUCTOR REQUIREMENTS.** Units of instruction which require more than one instructor per instructional group are identified in the multiple instructor annex to this POI.

5. **REFERENCES.** This plan of instruction is based on SPECIALTY TRAINING STANDARD 566X0, 7 November 1974, and Course Chart 3ABR56630, 19 May 1975.

FOR THE COMMANDER

Leonard A. Hamilton

LEONARD A. HAMILTON, Col, USAF
Chief, Dept of Civil Engineering Tng

Supersedes Plan of Instruction 3ABR56630, 1 August 1973
OPR: Department of Civil Engineering Training
DISTRIBUTION: Listed on Page A

PLAN OF INSTRUCTION

COURSE TITLE
Entomology Specialist

BLOCK TITLE
Entomology Fundamentals, Pesticides, and Equipment

UNITS OF INSTRUCTION AND CRITERION OBJECTIVES 1	DURATION (HOURS) 2	SUPPORT MATERIALS AND GUIDANCE 3
1. Orientation to Course, Career Field, and Entomology Publications	3 (3/0) Day 1 (1.5/0)	

1. Orientation to Course, Career Field, and Entomology Publications

a. Welcome.

b. Air Force Career Program emphasizing the appropriate career field specialty and the importance of the job which the student will be doing upon graduation.

c. Opportunities for career advancement including the following:

(1) Benefits to be gained from successful completion of courses and consequences of failure to complete course.

(2) Career advancement through the Air Force OJT Program.

(3) Academic credit from civilian educational institutions through CCAF transcript.

d. Course organization, objectives, and brief summary of school policies, including grading practices.

Column 1 Reference	STS Reference
1a, 1b, 1c, 1d, 1e, 1f, 1g, 1h, 1i,	None
1j, 1k, 1l, 1m, 1n, 1o, 1p, 1q,	None
1r	1a, 1b, 1c, 5b(1)
1s	4a, 4b, 6a
1t	4c, 4d, 4e, 6a

Instructional Materials
SG 3ABR56630-I-1, Orientation to Course, Career Field and Entomology Publications
SG AFS 54, 55, 56, Publications (All Courses)
WB 3ABR56630-I-1-P1, Orientation to Course, Career Field and Entomology Publications
HO 566X0, Training Experience Inventory
AFM 91-16, Military Entomology Operational Handbook
AFR 0-2, Numerical Index of Standard AF Publications and Recurring Publications

Training Methods
Discussion/Demonstration (1.5 hrs)
Performance (1.5 hrs)

Instructional Environment/Design
Classroom (1.5 hrs)
Laboratory (1.5 hrs)
Group/Lockstep

PLAN OF INSTRUCTION NO.	DATE	BLOCK NO.	PAGE NO.
3ABR56630	15 May 1975	I	1

PLAN OF INSTRUCTION (Continued)

UNITS OF INSTRUCTION AND CRITERION OBJECTIVES 1	DURATION (HOURS) 2	SUPPORT MATERIALS AND GUIDANCE 3
e. Requirements for high performance standards f. Honor Graduate Program g. Advantages and characteristics of a useable student notebook h. Counselling and remedial instruction i. Proficiency advancement of qualified students j. Student habits k. Safeguarding classified information l. Accident prevention and safety practices m. Shelter exercises and procedures n. Student critique program o. Energy conservation p. Disposition of eliminees q. Types, use, and care of instructional materials		Instructional Guidance Introduce the department, branch and course organizational structure to include the name and grade of the department chief, branch chief, course supervisor, and instructors with whom the students will make contact. Emphasize the fact that the course operates strictly in accordance with the policies established by the department and branch chiefs. Present a thorough overview of the course operating policies starting with punctuality requirements, dress and personal appearance, break periods, sick call, shelter exercises, and shelter locations. Describe the type literature to be used, the requirements for home study by all students and emphasize the availability of outstanding textbooks in the course library. Outline the measurement program and emphasize the opportunitites for proficiency advancement. Also, describe washback and elimination procedures. Stress the overriding need to preserve environmental quality while carrying out effective pest control programs. Discuss Civil Engineering organizational structure and career progression. Discuss publications system and then work practical projects, particularly as applied to engineering entomology, always stressing the importance of adhering to AF policy in regard to publications discipline. Instructor Reference: SCH REG 50-30, Student Orientation and Motivational Procedures

PLAN OF INSTRUCTION NO. 3ABR56630	DATE 15 May 1975	BLOCK NO. I	PAGE NO. 2

UNITS OF INSTRUCTION AND CRITERION OBJECTIVES 1	DURATION (HOURS) 2	SUPPORT MATERIALS AND GUIDANCE 3
r. Given reference materials, list the organizational structure of civil engineer organization.	(0.5/0)	
s. Using indexes, locate and list selected publications as prescribed by the instructor.	(0.5/0)	
t. Using selected entomology publications, list data needed to complete job requirement and responsibilities for insect, rodent, and vegetation control.	(0.5/0)	
2. Basic Principles of Pest Control	2 (2/0) Day 1	Column 1 Reference — STS Reference 2a — 8a, 8b, 8c, 8d, 8e, 10a, 10b(4) 2b — 7d, 7e, 7f, 8a, 8b, 8c, 8d, 10a Instructional Materials SG 3ABR56630-I-2, Basic Principles of Pest Control WB 3ABR56630-I-2-P1, Basic Principles of Pest Control AFM 91-16, Military Entomology Operational Handbook AFR 91-21, Pest Management Program Training Methods Discussion (1 hr) Performance (1 hr) Instructional Environment/Design Classroom (1 hr) Laboratory (1 hr) Group/Lockstep
a. Using reference data, describe nine basic principles employed by pest control agencies in accomplishment of pest control operations.	(1/0)	
b. List the six steps necessary in planning a sound pest control program, in accordance with AFM 91-16.	(1/0)	

PLAN OF INSTRUCTION (Continued)

1 UNITS OF INSTRUCTION AND CRITERION OBJECTIVES	2 DURATION (HOURS)	3 SUPPORT MATERIALS AND GUIDANCE
		Instructional Guidance Discuss each pest control principle, with emphasis on selection criteria. Stress the fact that chemicals are used normally as a last resort. Provide necessary assistance in the accomplishment of workbooks and performance project. Commercial texts: Pest Control; Handbook of Pest Control; Applied Entomology; Biological Techniques. AFR 161-1, Control of Vector-Borne Diseases
3. Sanitation in the Control of Pests	1 (1/0) Day 1	**Column 1 Reference** 3a, 3b, 3c **STS Reference** 10b(1), 10b(2)
a. Using reference material, describe the importance of sanitation in the control of insect and rodent pests.	(0.3/0)	**Instructional Materials** SG 3ABR56630-I-3, Sanitation in the Control of Pests WB 3ABR56630-I-3-P1, Sanitation in the Control of Pests AFM 91-16, Military Entomology Operational Handbook
b. Given reference material, list three phases of refuse handling.	(0.2/0)	Center for Disease Control Manual (CDC), Sanitation in the Control of Insects and Rodents
c. Using reference data, list three types of refuse disposal.	(0.5/0)	**Audio Visual Aids** Training Films: FLC 18-44, Refuse Disposal by Sanitary Landfill TF 8-1672, Sanitary Techniques in Rat Control **Training Methods** Discussion (.5 hr) Performance (.5 hr) **Instructional Environment/Design** Classroom (.5 hr) Laboratory (.5 hr) Group/Lockstep

PLAN OF INSTRUCTION NO.	DATE	BLOCK NO.	PAGE NO.
3ABR56630	15 May 1975	I	4

PLAN OF INSTRUCTION (Continued)

UNITS OF INSTRUCTION AND CRITERION OBJECTIVES 1	DURATION (HOURS) 2	SUPPORT MATERIALS AND GUIDANCE 3
		Instructional Guidance Discuss the relationship of sanitation to the overall ecology of the area. Commercial text: Municipal and Rural Sanitation. Show films.
4. Field Ecology	6 (6/0) Day 2	Column 1 Reference — STS Reference 4a — 7a, 9d, 9e 4b — 7d, 7e, 9b, 9c, 9d, 9e, 9f, 9g(1), 9g(2), 9g(3), 9g(4), 9g(5) 4c — 9p, 11h Instructional Materials SG 3ABR56630-I-4, Field Ecology WB 3ABR56630-I-4-P1, Field Ecology AFM 91-16, Military Entomology Operational Handbook Audio Visual Aids Training Film, HB PMB/2-54-8, Pesticides and Wildlife Training Methods Discussion/Demonstration (3 hrs) Performance (3 hrs) Instructional Environment/Design Classroom (3 hrs) Field (3 hrs) Group/Lockstep Instructional Guidance Discuss the ecosystem concept of biology and the importance of man's activities to environmental quality. Discuss the harmful and beneficial effects of insects and other life forms. Discuss the use of quarantines as a means of preventing the disruption of ecosystems by alien species. Discuss surveys, tests, and plans for pest control programs as a means of affecting pest control while minimizing environmental pollution.
a. Using selected references, explain and list the ecosystem views of biology as they relate to entomology operations.	(1.5/0)	
b. Using reference materials, list the methods for reducing environmental damage and health hazards of pesticides.	(1.5/0)	
c. Through use of a field trip, locate and record the effects of pesticides on the environment.	(3/0)	

PLAN OF INSTRUCTION NO. 3ABR56630	DATE 15 May 1975	BLOCK NO. I	PAGE NO. 5

PLAN OF INSTRUCTION (Continued)

UNITS OF INSTRUCTION AND CRITERION OBJECTIVES 1	DURATION (HOURS) 2	SUPPORT MATERIALS AND GUIDANCE 3	
		Stress the extreme importance of a thorough familiarity with pesticides and their effects on the entire ecosystem. Some ecosystem structures may be demonstrated in the natural environment of SAFB property. Commercial texts: Plant Communities (B-53); Ecology and Field Biology (B-40); Weeds of the World, Biology and Control (B-29); The Ecosystem Concept in Natural Resource Management (B-49); USDHEW, Report of the Secretary's Commission on Pesticides and their Relationship to Environmental Health (B-50)	
5. Epidemiology of Vector-Borne Diseases	4	Column 1 Reference	STS Reference
	(4/0)	5a	7a, 7f
	Day 3	5b	7a, 7c(1)(a), 7c(1)(b), 7c(1)(c), 7c(1)(d), 8a, 9b, 9j, 9p
a. Using reference materials, research and list the host-parasite and host-vector relationships involved in the transmission of diseases.	(2/0)		
b. Using selected materials, locate and list arthropod vectors of disease and the techniques of control of vector-borne disease.	(2/0)	Instructional Materials SG 3ABR56630-I-5, Epidemiology of Vector-Borne Diseases WB 3ABR56630-I-5-P1, Epidemiology of Vector-Borne Diseases AFM 91-16, Military Entomology Operational Handbook CDC, Epidemiology and Control of Vector-Borne Diseases	
		Audio Visual Aids Training Film: M-542, Arthropod-Borne Encephalitis	
		Training Methods Discussion/Demonstration (2.5 hrs) Performance (1.5 hrs)	
		Instructional Environment Design Classroom (2.5 hrs) Laboratory (1.5 hrs) Group/Lockstep	

PLAN OF INSTRUCTION NO. 3ABR56630	DATE 15 May 1975	BLOCK NO. I	PAGE NO. 6

PLAN OF INSTRUCTION (Continued)

UNITS OF INSTRUCTION AND CRITERION OBJECTIVES 1	DURATION (HOURS) 2	SUPPORT MATERIALS AND GUIDANCE 3
		Instructional Guidance Emphasize the importance of field operations to epidemics and their control through vector, or reservoir control; the importance of transmission cycles; and the best stages for control. Emphasize the need for comprehending the film in order to understand the need for protecting national health. Commercial text: Medical Entomology; USNDVCC Manual, Medical Entomology.
6. Pesticide Classification and Characteristics	6 (6/0) Days 3,4	
a. Using assigned reference material, determine and list general methods of classifying pesticides.	(1/0)	
b. Using technical data, research and list characteristics of commonly used pesticides as prescribed by the instructor.	(2/0)	
c. Using assigned technical material, determine and list the harmful effects of pesticides on humans, animals, buildings, and vegetation.	(2/0)	
d. Using reference materials, research and indicate pesticides which are not harmful to buildings, paints, or domestic vegetation.	(1/0)	

Column 1 Reference	STS Reference
6a, 6b, 6c	9a(1), 9a(2), 9a(3), 9a(4), 9a(5), 9a(6), 9a(7), 9a(8), 9a(9), 9a(10), 9a(11), 9a(12), 9a(13), 9a(14), 9a(15), 9a(16), 9a(17), 9a(18), 9a(19), 9a(20), 9a(21)
6d	9d, 9e

Instructional Materials
SG 3ABR56630-I-6, Pesticide Classification and Characteristics
WB 3ABR56630-I-6- P1, Pesticide Classification and Characteristics
AFM 91-16, Military Entomology Operational Handbook
CDC, Insecticides
CDC, Rodent Eradication and Poisoning Programs

Audio Visual Aids
Training Film, M204, Health Hazards of Pesticide

Training Methods
Discussion/Demonstration (4 hrs)
Performance (2 hrs)

PLAN OF INSTRUCTION (Continued)

1 UNITS OF INSTRUCTION AND CRITERION OBJECTIVES	2 DURATION (HOURS)
7. Pesticide Safety	4 (4/0) Days 4, 5
a. Using reference materials, list and explain the hazards of acute exposure to various pesticides as indicated by the instructor.	(.5/0)
b. Given a specific pest control situation, identify and list protective equipment and clothing as required for the situation.	(1/0)
c. Using reference materials, list the first aid procedures for victims of accidental poisoning.	(.5/0)
d. Using prescribed materials and procedures, inspect, clean and store protective equipment and clothing.	(1/0)

3 SUPPORT MATERIALS AND GUIDANCE

Instructional Environment/Design

Classroom (4 hrs)
Laboratory (2 hrs)
Group/Lockstep

Instructional Guidance

Stress the need for your students to be familiar with the chemicals that they may come in contact with. Emphasize the importance of using low residual and low toxic chemical. Commercial Texts: Insecticides; Action and Metabolism; Pesticide Information and Safety Manual.

Column 1 Reference	STS Reference
7a	3a
7b	3b, 3g
7c	3h
7d	3c, 3d, 3e
7e	3b, 3e, 3f, 3g, 9c, 9d, 9g(1), 9g(2), 9g(3), 9g(4), 9g(5)

Instructional Materials

SG 3ABR56630-I-7, Pesticide Safety
WB 3ABR56630-I-7-P1, Pesticide Safety
AFM 91-16, Military Entomology Operational Handbook
AFR 91-21, Pest Management Program

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PLAN OF INSTRUCTION (Continued)

UNITS OF INSTRUCTION AND CRITERION OBJECTIVES 1	DURATION (HOURS) 2	SUPPORT MATERIALS AND GUIDANCE 3
e. Using AFM 91-16 and related references, locate and list the safety precautions to observe when mixing and applying pesticides and herbicides.	(1/0)	Training Methods Discussion/Demonstration (2 hrs) Performance (2 hrs) Instructional Environment/Design Classroom (2 hrs) Laboratory (2 hrs) Group/Lockstep Instructional Guidance Approach this instruction on entomology safety in all earnestness. You are about to present instructions which, if not accurate and effective, may seriously affect the health and welfare of persons and animals not associated in any way with our school.
8. Safe Disposal of Pesticides	1 (1/0) Day 5	Column 1 Reference 8a, 8b STS Reference 5a(9)(a), 5a(9)(b), 5a(9)(c), 5a(9)(d)
a. Using reference materials, determine and list the general methods of pesticide disposal.	(.5/0)	Instructional Materials SG 3ABR45530-I-8, Safe Disposal of Pesticides WB 3ABR56630-I-8-P1, Safe Disposal of Pesticides
b. Using available directives and data, determine and list the available methods for disposal of empty pesticide containers and surplus pesticides.	(.5/0)	Training Methods Discussion/Demonstration (.5 hr) Performance (.5 hr) Instructional Environment/Design Classroom (.5 hr) Laboratory (.5 hr) Group/Lockstep

1 UNITS OF INSTRUCTION AND CRITERION OBJECTIVES	2 DURATION (HOURS)	3 SUPPORT MATERIALS AND GUIDANCE
		Instructional Guidance Emphasize that new facts and guidelines are continually coming out in this area, and it is extremely important to stay current. Instructor Reference: WGP-OS-1, Summary of Interim Guidelines for Disposal of Surplus or Waste Pesticides and Pesticide Containers
9. Chemical Laboratory and Storage Facility Maintenance	3 (3/0) Day 5	**Column 1 Reference** — **STS Reference** 9a — 3d, 5a(8)(b) 9b — 3d 9c — 3c, 5a(8)(b)
a. Using technical guidance provided, list the requirements for maintaining a safe pesticide storage area and inspect course storage area for compliance with requirements to include: (1) Ventilation (2) Lighting fixtures (3) Security of storage (4) Safety equipment (5) Inventories	(1/0)	**Instructional Material** SG 3ABR56630-I-9, Chemical Laboratory and Storage Facility Maintenance WB 3ABR56630-I-9-P1, Chemical Laboratory and Storage Facility Maintenance AFM 91-16, Military Entomology Operational Handbook AFR 91-21, Pest Management Program **Training Equipment** Cleaning and Disposal Equipment (12) **Training Methods** Discussion/Demonstration (1 hr) Performance (2 hrs)
b. With technical guidance provided, clean equipment to conform to ground safety and fire directives.	(1/0)	**Instructional Environment/Design** Classroom (1 hr) Laboratory(2 hrs)
c. Perform cleaning and storage procedures on articles of safety equipment and poison storage area in accordance with AFM 91-16 and AFR 91-21.	(1/0)	Group/Lockstep

PLAN OF INSTRUCTION (Continued)

1 UNITS OF INSTRUCTION AND CRITERION OBJECTIVES	2 DURATION (HOURS)
10. Hand-Powered Dispersal Equipment	6 (6/0) Day 6
a. Given handpowered dispersal equipment, identify and list uses of important hand dispersal equipment used in pest control operations.	(1/0)
b. Using appropriate technical manuals and instructions, perform preoperational inspection and servicing of hand dispersal equipment.	(1/0)
c. Using technical manuals, tools, and parts provided, accomplish minor repairs, as necessary, to include replacement of parts.	(1/0)
d. Using appropriate technical manuals, calibrate and operate hand-powered dispersal equipment in real or simulated pest control situations, using inert materials rather than toxins in case of a simulated problem.	(3/0)

3 SUPPORT MATERIALS AND GUIDANCE

Instructional Guidance
Have students check facility for proper safety compliance. Students will compile a pesticidal inventory of storage room. Students will accomplish necessary waste disposal and cleanup to insure a safe working environment, free from chemical contaminates. WARNING: Close supervision will be required to insure that students do not become contaminated with toxicants from empty containers, contaminated equipment, etc. Reference: WGP-DS-1 Summary of Interim Guidelines for Disposal of Surplus of Waste Pesticides and Pesticide Containers

Column 1 Reference	STS Reference
10a	9h(1), 9h(2), 9h(3), 9h(7)
10b	3e, 4d, 12a(4), 12a(5)
10c	12b(1), 12b(5), 12b(9)(a), 12b(9)(b), 12b(9)(c), 12b(9)(d)
10d	9h(1), 9h(2), 9h(3), 9h(7), 12b(9)(a)

Instructional Materials
SG 3ABR56630-I-10, Hand-Powered Dispersal Equipment
WB 3ABR56630-I-10-P1, Hand-Powered Dispersal Equipment
AFM 91-16, Military Entomology Operational Handbook
Equipment Operation and Maintenance Instructions
CDC, Insecticide Application Equipment for the Control of Insects of Public Health Importance

Training Equipment
Pistol Sprayer (12)
Compressed Air Sprayer (1)
Hand Dusters (Bulb Type) (6)
Hand Plunger Duster (12)
Foot Pump Duster (1)
Rotary Duster (1)
Siphon Atomizer (1)
Truck, Stake and Platform, 1-1/2 Ton (12)

PLAN OF INSTRUCTION (Continued)

1 UNITS OF INSTRUCTION AND CRITERION OBJECTIVES	2 DURATION (HOURS)	3 SUPPORT MATERIALS AND GUIDANCE	
		Training Methods Discussion/Demonstration (2 hrs) Performance (4 hrs) **Instructional Environment/Design** Classroom (2 hrs) Laboratory (2 hrs) Field (2 hrs) Group/Lockstep **Instructional Guidance** Use selected items of hand-powered dispersal equipment in real or simulated field problems. Students will use all applicable items of safety equipment. Special emphasis on compressed air sprayer is required. This equipment is used extensively throughout the Air Force. It is very important, therefore, that each student becomes intimately familiar with the proper procedures for use, care and maintenance of the equipment.	
11. Power-Driven Dispersal Equipment	24 (20/4) Days 7, 8, 9 and 10	Column 1 Reference	STS Reference
		11a	3e, 9h(4), 9h(5), 9h(6), 9h(8), 9h(9), 9h(10), 9h(11), 12a(1), 12a(2), 12a(3), 12a(4), 12c
a. Using appropriate technical manuals and checklists, perform preoperation inspection and servicing of power-driven dispersal equipment assigned by the instructor.	(6/0)	11b	4d, 12b(1), 12b(2), 12b(3), 12b(4), 12b(5), 12b(6), 12b(8), 12b(9)(a), 12b(9)(b), 12b(9)(c), 12b(9)(d)
		11c	3b, 3e, 3f, 3g, 4d, 9b, 9h(4), 9h(5), 9h(6), 9h(8), 9h(9), 9h(10), 9h(11), 12b(7)

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PLAN OF INSTRUCTION (Continued)

UNITS OF INSTRUCTION AND CRITERION OBJECTIVES 1	DURATION (HOURS) 2	SUPPORT MATERIALS AND GUIDANCE 3
b. Using technical manuals, tools, and parts, clean and accomplish repairs, as necessary, to include replacement and/or adjustment of component parts.	(6/2)	Instructional Materials SG 3ABR56630-I-11, Power-Driven Dispersal Equipment WB 3ABR56630-I-11-P1, Power-Driven Dispersal Equipment AFM 91-16, Military Entomology Operational Handbook TO 38G2-102-2, Operator, Organizational, Direct Support and General Support Maintenance Manual, Engine, Gasoline TO 38G2-102-4, Organizational, Direct and General Support Maintenance Repair Parts, Engine, Gasoline TM 5-3740-200-15, Operator, Organizational, Direct Support, General Support and Depot Maintenance Manual, Sprayer, Insecticide TM 5-3740-200-25P, Organizational, Direct and General Support, and Depot Maintenance Repair Parts and Special Tools List, Sprayer, Insecticide CDC, Insecticide Application Equipment for the Control of Insects of Public Health Importance Audio Visual Aids Training Film: TFM-442, Space Spraying Insecticides Training Equipment Leco Thermal Fogger (12) Curtis Dyna-Foggers (12) Mechanical Aerosol General (Vehicle-Mounted) (12) Exploder, Carbide Type (12) Backpack Mister Duster (4) Skid-Mounted Hydraulic Sprayer (12) Trailer-Mounted Hydraulic Sprayer (12) Vehicle-Mounted Mist-Dust Blower (Buffalo Turbine) (12) Truck, Stake and Platform, 1-1/2 Ton (12) Micron Generation Unit (ULV), Hand Carried (6) Dispenser Insecticide (Dichlorvos Vapor) (12)
c. Using appropriate technical manuals and checklists, calibrate and operate all types of power-driven dispersal equipment (in course inventory) in simulated pest control situations, using inert materials rather than toxins.	(8/2)	

PLAN OF INSTRUCTION (Continued)

1 UNITS OF INSTRUCTION AND CRITERION OBJECTIVES	2 DURATION (HOURS)	3 SUPPORT MATERIALS AND GUIDANCE
		Training Methods Discussion/Demonstration (3 hrs) Performance (17 hrs) Outside Assignments (4 hrs) Instructional Environment/Design Classroom (3 hrs) Laboratory (3 hrs) Field (14 hrs) Study Hall (4 hrs) Group/Lockstep Instructional Guidance Students will use all applicable items of safety equipment. All performance will be accomplished under strict supervision by qualified instructors. Instructors will perform the dilution formulas as the students will not have had such lessons. However, if a student proficient in algebra is in the class, he should be allowed to attempt the dilution formulas. Students should become proficient with all pieces of equipment. Outside assignment: Day 8, direct students to read SG I-11 and answer review questions. Day 9, direct students to read SG I-12 and answer review questions. Also, review all block I material in preparation for end-of-block measurement test.
12. Selection of Proper Pest Control Methods a. Given a pest control problem situation and reference materials, select and list the best nonchemical permanent type control that can be taken, or if necessary, the proper chemical methods that would be used.	4 (2/2) Day 10 (2/2)	Column 1 Reference 12a STS Reference 4a, 4b, 4c, 4d, 4e, 8a, 8b, 8c, 8d, 8e, 9b, 9c, 9d, 9e, 9f, 9g(1), 9g(2), 9g(3), 9g(4), 9g(5) Instructional Materials SG 3ABR56630-I-12, Selection of Proper Pest Control Techniques WB 3ABR56630-I-12-P1, Selection of Proper Pest Control Techniques AFM 91-16, Military Entomology Operational Handbook

PLAN OF INSTRUCTION (Continued)

1 UNITS OF INSTRUCTION AND CRITERION OBJECTIVES	2 DURATION (HOURS)	3 SUPPORT MATERIALS AND GUIDANCE
		Training Methods Discussion/Demonstration (1 hr) Performance (1 hr) Outside Assignments (2 hrs) Instructional Environment/Design Classroom (1 hr) Laboratory (1 hr) Study Hall (2 hrs) Group/Lockstep Instructional Guidance Discuss criteria which determines the selection of proper pest control methods. Explain and demonstrate nonchemical permanent type controls and explain proper chemical control which is used when necessary. Outside Assignment: Direct students to read SG II-1 and answer review questions.
13. Related Training (identified in course chart)	14	
14. Measurement Test and Test Critique	2 (2/0) Day 10	

PLAN OF INSTRUCTION	COURSE TITLE Entomology Specialist

BLOCK TITLE
Control of Medically Important Pests

UNITS OF INSTRUCTION AND CRITERION OBJECTIVES 1	DURATION (HOURS) 2
1. **Pesticide Formulation Calculations**	24 (18/6) Days 11, 12 and 13
a. Using technical data provided and AFM 91-16, describe and list the components of various pesticide formulations.	(3/1)
b. Using technical data provided, describe the methods of dispersing pesticides.	(2/1)
c. Give appropriate formulas from AFM 91-16, calculate and formulate pesticide dilutions and dosages for assigned problems and situations.	(12/3)
d. Given appropriate forms and guidance, complete records of chemicals used and areas treated in accordance with directives.	(1/1)

SUPPORT MATERIALS AND GUIDANCE 3

Column 1 Reference	STS Reference
1a	9c
1b	9f
1c	9c
1d	9n, 9o

Instructional Materials
SG 3ABR56630-II-1, Pesticide Formulation Calculations
WB 3ABR56630-II-P1, Pesticide Formulation Calculations
CDC, Insecticides for the Control of Insects of Public Health Importance
AFM 91-16, Military Entomology Operational Handbook

Training Equipment
Scales and Counterbalances (12)
Graduated Cylinders (12)

Training Methods
Discussion/Demonstration (2 hrs)
Performance (16 hrs)
Outside Assignments (6)

Instructional Environment/Design
Classroom (2 hrs)
Laboratory (16 hrs)
Study Hall (6 hrs)
Group/Lockstep

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PLAN OF INSTRUCTION (Continued)

1 UNITS OF INSTRUCTION AND CRITERION OBJECTIVES	2 DURATION (HOURS)	3 SUPPORT MATERIALS AND GUIDANCE
		Instructional Guidance Emphasize importance of measuring pesticide concentrates precisely. Emphasize importance of safety while formulating pesticides. Make sure that the problems are solved in a step-by-step manner. Outside Assignments: Day 11, direct students to solve problems in WB II-1-P1. Day 12, direct students to review SG II-1 and complete problems in WB II-1-P1. Day 13, direct students to read SG II-2 and II-3 and answer questions at end of each SG; also read SG II-4.
2. Systematic Biology	3 (2/1) Day 14	
a. Using reference materials provided, correlate the taxonomic characteristics of an insect to man.	(1.5/1)	
b. Using reference materials provided, identify the most important phylum from the standpoint of human suffering and economic loss.	(.5/0)	

Column 1 Reference	STS Reference
2a	7c(1)(a), 7c(1)(b), 7c(1)(c), 7c(1)(d), 7c(2)(c), 7c(3)(a), 7c(3)(b), 7c(3)(c), 7c(3)(d), 7c(3)(e), 7c(3)(f), 7c(3)(g), 7c(4)(a), 7c(4)(b), 7c(4)(c), 7c(5)(a), 7c(5)(b), 7c(5)(c), 7c(7)(a), 7c(7)(b), 7c(7)(c), 7c(7)(d), 7c(7)(e), 7c(9)(a), 7c(9)(b), 7c(9)(c), 7c(9)(d), 7c(9)(e), 7c(9)(f), 7c(9)(g)
2b	7a

Instructional Materials

SG 3ABR56630-II-2, Systematic Biology
WB 3ABR56630-II-2-P1, Systematic Biology
AFM 91-16, Military Entomology Operational Handbook
CDC, Pictorial Keys to Some Arthropods and Mammals
CDC, Key to Stored Products Pests

Training Methods

Discussion/Demonstration (1.5 hrs)
Performance (.5 hr)
Outside Assignments (1 hr)

PLAN OF INSTRUCTION (Continued)

1 UNITS OF INSTRUCTION AND CRITERION OBJECTIVES	2 DURATION (HOURS)	3 SUPPORT MATERIALS AND GUIDANCE
		Instructional Environment/Design Classroom (1.5 hrs) Laboratory (.5 hr) Study Hall (1 hr) Group/Lockstep **Instructional Guidance** Discuss classification scheme as kingdom (plant, animal, and undefined), phylum, class, order, family, genus, and species; and nomenclature as scientific and common name. Use examples of human and housefly. Have students learn how to use a key and then give them a sample. Both pictorial and word keys should be given. Commercial texts: Handbook of Pest Control (B-8); Introduction to the Study of Insects (B-24); Destructive and Useful Insects (B-52); USN Medical School Manual, Medical Entomology
3. General Biology of the Arthropods	3 (2/1) Day 14	**Column 1 Reference** — **STS Reference** 3a, 3b, 3c, 3d — 7c(1)(a), 7c(1)(b), 7c(1)(c), 7c(1)(d), 7c(1)(e), 7c(2)(a), 7c(2)(b), 7c(2)(c), 7c(3)(a), 7c(3)(b), 7c(3)(c), 7c(3)(d), 7c(3)(e), 7c(3)(f), 7c(3)(g), 7c(4)(a), 7c(4)(b), 7c(4)(c), 7c(7)(a), 7c(7)(b), 7c(7)(c), 7c(7)(d), 7c(7)(e), 7c(9)(a), 7c(9)(b), 7c(9)(c), 7c(9)(d), 7c(9)(e), 7c(9)(f), 7c(9)(g)
a. Research technical data and list the characteristics of the phylum arthropoda.	(.3/0)	
b. Research technical data and list the major differences in the body systems of the insects and those of higher animals.	(.5/.5)	3e — 7c(2)(c)
c. Research technical data provided and list the characteristics of the class Insecta	(.2/0)	**Instructional Materials** SG 3ABR56630-II-3, General Biology of the Arthropods WB 3ABR56630-II-3-P1 General Biology of the Arthropods. CDC, Introduction to the Arthropods of Public Health Importance

PLAN OF INSTRUCTION (Continued)

UNITS OF INSTRUCTION AND CRITERION OBJECTIVES 1	DURATION HOURS 2	SUPPORT MATERIALS AND GUIDANCE 3	
d. Research technical data provided and list the usual bases for insect classification. e. Research technical data provided and list the beneficial aspects of arthropods.	(.5/.5) (.5/0)	Training Methods Discussion/Demonstration (1.5 hrs) Performance (.5 hr) Outside Assignments (1 hr) Instructional Environment/Design Classroom (1.5 hrs) Laboratory (.5 hr) Study Hall (1 hr) Group/Lockstep Instructional Guidance Discuss classification basis: wing venation, presence or absence of wings, wing form; chewing, piercing-sucking mouthparts; ametabolous, hemimetabolous, and holometabolous metamorphosis; stinging apparatus. Show the students the following insects and spiders: tarantula, jumping spider, robber fly, giant water bug, water scavenger. Each student will identify these specimens based on key characteristics. Commercial Texts: Destructive and Useful Insects (B-52); Yearbook of Agriculture, 1952 (B-27, 28); The Insect Guide (B-17); The Insects (B-55); USN Medical School Manual, Medical Entomology.	
4. Venomous Animals	2	Column 1 Reference	STS Reference
	(2/0)	4a	7c(2)(a), 7c(2)(b), 7c(2)(c), 7c(2)(d)
	Day 14	4b	7f
a. Using technical data provided and specimens, identify the important venomous animals.	(1/0)	4c	7f
		4d	10g

PLAN OF INSTRUCTION (Continued)

1 UNITS OF INSTRUCTION AND CRITERION OBJECTIVES	2 DURATION (HOURS)	3 SUPPORT MATERIALS AND GUIDANCE
b. Using technical information provided, list and describe the methods by which venoms are introduced.	(.3/0)	Instructional Materials SG 3ABR56630-II-4, Venomous Animals WB 3ABR56630-II-4-P1, Venomous Animals CDC, Spiders, Scorpions, and Other Arthropods and Their Control Audio Visual Aids Training Film: SFP-1589, Poisonous Snakes - USA Training Methods Discussion/Demonstration (1.5 hrs) Performance (.5 hr) Instructional Environment/Design Classroom (1.5 hrs) Laboratory (.5 hr) Group/Lockstep Instructional Guidance Emphasize care in handling specimens during performance. Extreme caution with the microscopes is mandatory. Show students how to properly hold and focus the scopes. Show the following specimens: bees, wasps, hornets, velvet ants, cicada killer, wheel bug, kissing bug, brown recluse, black widow, assassin bug, bedbug, bald-faced hornet, harvester ant, bumblebee, blister beetle, io moth, and scorpion. Commercial Texts: Herm's Medical Entomology (B-6); A Field Guide to the Reptiles and Amphibians (B-18); Snakes of the World (B-7); Insect Allergy (B-14). Outside Assignments: Direct students to review SGs II-2 and II-3, and the questions at the end of each SG; also read SG II-5.
c. Using technical data provided, describe the modes of action of animal venoms.	(.5/0)	
d. Using reference materials provided, describe the control measures required for venomous animals.	(.2/0)	

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PLAN OF INSTRUCTION (Continued)

1 UNITS OF INSTRUCTION AND CRITERION OBJECTIVES	2 DURATION (HOURS)	3 SUPPORT MATERIALS AND GUIDANCE
5. Mosquitoes	12 (8/4) Days 15,16	**Column 1 Reference** — **STS Reference** 5a, 5b, 5c — 7a, 7b, 7c(1)(a) 5d — 10a 5e — 7d 5f — 9h(1), 9h(2), 9h(3), 9h(4), 9h(5), 9h(6), 9h(7) 9h(8), 9h(9), 9h(10), 9h(11), 10b(2), 10c **Instructional Materials** SG 3ABR56630-II-5, Biology, Identification and Control of Mosquitoes WB 3ABR56630-II-5-P1, Biology, Identification and Control of Mosquitoes AFM 91-16, Military Entomology Operational Handbook CDC, Mosquitoes and their Control Technical Manual, Operation and Maintenance of Dispersal Equipment TM 5-3740-200-15, Operator, Organization, Direct Support, General Support and Depot Maintenance Manual, Sprayer, Insecticide **Audio Visual Aids** Training Films: M-191, Organized Mosquito Control; and M-127, Mosquito Survey Techniques **Training Equipment** Mosquito Specimens (12) Laboratory Optical Instruments (1) Mosquito Survey Equipment (1) Aerosol Generators (Standard and ULV) (6) Hydraulic Sprayers (6) Hand Operated Dispersal Equipment (2) Truck, Stake and Platform, 1-1/2 ton (12)
a. Using reference materials provided, describe in student discussion and record the role of mosquitoes in disease transmission.	(1/1)	
b. Using reference materials provided, describe in student discussion, and record the biological factors that must be considered in selecting and planning control measures.	(1/.5)	
c. Using identification keys and specimens, identify the important genera of mosquitoes.	(1/1)	
d. Using equipment provided, perform mosquito survey and collection procedures in accordance with data referenced in the study guide.	(1/.5)	
e. Using the technical manuals provided, list the methods of minimizing disease transmission.	(1/1)	
f. Using equipment and technical manuals provided, and under the direction of instructors perform mosquito control measures in a real or simulated situation.	(3/0)	

PLAN OF INSTRUCTION (Continued)

UNITS OF INSTRUCTION AND CRITERION OBJECTIVES 1	DURATION (HOURS) 2	SUPPORT MATERIALS AND GUIDANCE 3
		Training Methods Discussion/Demonstration (2 hrs) Performance (6 hrs) Outside Assignments (4 hrs) **Instructional Environment/Design** Classroom (2 hrs) Laboratory (3 hrs) Field (3 hrs) Study Hall (4 hrs) Group/Lockstep **Instructional Guidance** Emphasize differences in habitats, identification, and survey of different genera. Identify Aedes, Culex, and Anopheles, males and females. Control measures will be coordinated with base CE to insure usefulness of project to the mission. Care will be taken to minimize environmental contamination. Commercial Texts: Herm's Medical Entomology (B-6); Introduction to the Study of Insects (B-24); Introduction to Parasitology (B-12); The Biology of Disease-Borne Mosquitoes. Outside Assignment: Day 15, direct students to complete any unfinished portion of WB II-5-P1 also read SG II-6 and answer review questions.
6. Flies a. Using reference materials provided, correctly describe the role of flies in disease transmission.	10 (8/2) Days 16, 17 (1/.5)	see below

Column 1 Reference	STS Reference
6a	7a, 7c(1)(d)
6b	7b, 7c(1)(b), 10b(1)
6c	7b, 7c(1)(b)
6d	7c(1)(b), 7d, 8a, 10a, 10b(1)
6e	8c, 10b(1)
6f	9h(1), 9h(2), 9h(3), 9h(4), 9h(5), 9h(6), 9h(7), 9h(8), 9h(9), 9h(10), 9h(11)

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PLAN OF INSTRUCTION (Continued)

1 UNITS OF INSTRUCTION AND CRITERION OBJECTIVES	2 DURATION (HOURS)	3 SUPPORT MATERIALS AND GUIDANCE
b. Using references provided, describe the biological factors of flies that must be considered in selecting and planning control measures.	(1/.5)	Instructional Materials SG 3ABR56630-II-6, Biology, Identification, and Control of Flies WB 3ABR56630-II-6-P1, Biology, Identification, and Control of Flies AFM 91-16, Military Entomology Operational Handbook CDC Manual, Flies and Their Control Technical Manuals, Operation and Maintenance Instructions for Dispersal Equipment Audio Visual Aids Training Film: Community Fly Control Operations and Biology Training Equipment Microscopes (1) Truck, Stake and Platform, 1-1/2 Ton (12) Fly Survey Equipment (6) Mist-Dust Blowers (6) Hydraulic Sprayers (6) Hand Sprayers (6) Fly Specimens (12) Training Methods Discussion/Demonstration (2 hrs) Performance (6 hrs) Outside Assignments (2 hrs) Instructional Environment/Design Classroom (2 hrs) Laboratory (3 hrs) Field (3 hrs) Study Hall (2 hrs) Group/Lockstep
c. Using identification keys and fly specimens, identify by matching keys to the specimens.	(1/0)	
d. Using equipment provided, perform fly survey and collection procedures in accordance with AFM 91-16.	(1/0)	
e. Researching selected technical manuals, list the methods of minimizing fly-borne diseases.	(1/1)	
f. Using equipment and technical manuals provided, and under the direction of the instructors, perform fly control measures in a real or simulated situation.	(3/0)	

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1 UNITS OF INSTRUCTION AND CRITERION OBJECTIVES	2 DURATION (HOURS)	3 SUPPORT MATERIALS AND GUIDANCE
		Instructional Guidance Show specimens of important fly species: sewer fly, black fly, housefly lesser housefly, stable fly, false stable fly, bottle flies, blowfly, horsefly, deerfly, and secondary screwworm fly. Prior to control procedures, a survey using the fly grill should be conducted. Once the fly problem has been isolated, control measures should be taken. Treatment of fly breeding areas will be accomplished with coordination of the Base CE Entomology Section. Commercial Texts: Herm's Medical Entomology (B-6); Introduction to the Study of Insects (B-4); Flies and Diseases: Introduction to Parasitology (B-12). Outside Assignment: Day 16, direct students to review SG II-6, read SG II-7, and answer review questions.
7. Ectoparasites	10 (8/2) Days 17, 18	Column 1 Reference 7a, 7b, 7c, 7d STS Reference 7b, 7c(1)(c), 7c(1)(d), 7c(1)(e), 7d, 7e, 8a, 10a
a. Using reference materials provided, describe the role of ectoparasites in disease transmission.	(3/1)	7e 9h(1), 9h(2), 9h(3), 9h(4), 9h(5), 9h(7), 9h(9), 9h(10), 9h(11)
b. Using reference materials provided, describe and list the biological factors of each ectoparasite that must be considered in selecting and planning control measures.	(1.7/1)	Instructional Materials SG 3ABR56630-II-7, Biology, Identification, and Control of Ectoparasites WB 3ABR56630-II-7-P1, Biology, Identification, and Control of Ectoparasites AFM 91-16, Military Entomology Operational Handbook CDC, Fleas and Their Control
c. Using identification keys and specimens provided, identify selected species of ectoparasites.	(.8/0)	CDC, Ticks of Public Health Importance and Their Control CDC, Lice and Their Control CDC, Mites of Public Health Importance and Their Control Technical Manuals, Operation and Maintenance of Dispersal Equipment

PLAN OF INSTRUCTION (Continued)

UNITS OF INSTRUCTION AND CRITERION OBJECTIVES 1	DURATION HOURS 2	SUPPORT MATERIALS AND GUIDANCE 3
d. Using equipment provided, perform ectoparasite survey using standard collection procedures.	(.5/0)	Audio Visual Aids Training Films: FLC 20/60, Ticks and Tick-borne Diseases: MN 4049, Plague Control Training Equipment Mist-Dust Blowers (6) Hand Sprayers/Dusters (6) Truck, Stake and Platform, 1-1/2 Ton (12) Ectoparasite Specimens (12) Training Methods Discussion/Demonstration (4.7 hrs) Performance (3.3 hrs) Outside Assignments (2 hrs) Instructional Environment/Design Classroom (4.7 hrs) Laboratory (2.3 hrs) Field (1 hr) Study Hall (2 hrs) Group/Lockstep Instructional Guidance Show the following specimens to the students: hard and soft ticks, head and pubic lice, fleas, and mites. Use all necessary safety equipment in the control operations. Coordinate with local CE entomology section. Commercial Texts: Herm's Medical Entomology (B-6); Introduction to the Study of Insects (B-24); Introduction to Parasitology (B-12). Outside Assignment: Day 17, direct students to complete unfinished portion of WB II-6-P1, and first part of WB II-7-P1. Day 18, direct students to complete unfinished portion of WB II-7-P1 and read SG II-8.
e. Using prescribed spray equipment, technical manuals, and under the direction of instructors, perform ectoparasite control measures.	(2/0)	

PLAN OF INSTRUCTION (Continued)

1 UNITS OF INSTRUCTION AND CRITERION OBJECTIVES	2 DURATION (HOURS)	3 SUPPORT MATERIALS AND GUIDANCE
8. Domestic Rodents	8 (6/2) Day 19	**Column 1 Reference** — **STS Reference** 8a — 7a, 7c(6) 8b — 7c(6) 8c — 7c(6) 8d — 7c(6), 10f 8e — 10e, 10f 8f — 10e, 10f **Instructional Materials** SG 3ABR56630-II-8, Biology, Identification, and Control of Domestic Rodents WB 3ABR56630-II-8-P1, Biology, Identification and Control of Domestic Rodents AFM 91-16, Military Entomology Operational Handbook CDC, Rodent Eradication and Poisoning Programs CDC, Biological Factors in Domestic Rodent Control **Audio Visual Aids** Training Films: TF1-8104, Rat Problem; TF-1670, Habit and Characteristics of the Rat **Training Equipment** Traps (1) Truck, Stake and Platform, 1-1/2 Ton (12) Rodent Specimens (12) **Training Methods** Discussion/Demonstration (4 hrs) Performance (2 hrs) Outside Assignments (2 hrs)
a. Using reference materials provided, describe and list the role of domestic rodents in disease transmission and economic loss.	(1.5/1)	
b. Using reference materials provided, describe the biological factors of domestic rodents that must be considered in selecting and planning control procedures.	(1/1)	
c. Using identification keys and specimens provided, identify important species of domestic rodents.	(.5/0)	
d. Using equipment provided, perform rodent survey and collection procedures in accordance with AFM 91-16.	(.5/0)	
e. Using the technical manuals provided, list and record the methods of minimizing rodent-borne diseases and economic loss.	(.5/0)	
f. Using equipment and technical manuals provided, and under the direction of the instructors, perform rodent control measures by setting traps and dispersing baits as required for poisoning operations.	(2/0)	

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Instructional Environment/Design
Classroom (4 hrs)
Laboratory (1 hr)
Field (1 hr)
Study Hall (2 hrs)
Group/Lockstep

Instructional Guidance
Emphasize safety in handling traps. Show stuffed rats. In performance, use safe practices in handling rodenticides when setting out bait boxes, and when disposing of dead specimens. Use care to avoid endangering domestic dogs and cats. Outside Assignment: Day 19, direct students to complete any unfinished portion of WB II-8-P1 and read SG II-9. Also review for Block II measurement test.

9. Field Rodents and Other Vertebrates — 4 (4/0) Day 20

a. Using identification keys and technical manuals provided, name some medically and economically important vertebrate species. — (1/0)

b. Using technical manuals provided, name in student discussion the precautions necessary when handling field rodents and predatory animals. — (.5/0)

Column 1 Reference	STS Reference
9a	7c(2)(d), 7c(8), 7c(10)
9b	7c(2)(d), 7c(8)
9c	7c(10)
9d	10b(3), 10b(4), 10e, 10f, 10g, 10h
9e	7c(2)(d), 7c(8), 7c(10)
9f	7d, 8d
9g	7e, 10b(1), 10b(2), 10b(3), 10b(4)
9h	7f

Instructional Materials
SG 3ABR56630-II-9, Biology, Identification and Control of Field Rodents and Other Vertebrates
WB 3ABR56630-II-9-P1, Biology, Identification and Control of Field Rodents and Other Vertebrates

1 UNITS OF INSTRUCTION AND CRITERION OBJECTIVES	2 DURATION (HOURS)	3 SUPPORT MATERIALS AND GUIDANCE
c. Using selected references, list the biological factors necessary to the identification and control of common pest birds.	(.5/0)	AFM 91-16, Military Entomology Operation Handbook CDC, Pictorial Keys Audio Visual Aids Identification Keys, NCDC Pictorial Keys Training Films: MN-440, Plague in Sylvatic Areas; and SFP 1589, Poisonous Snakes - USA USAF Film Report No. 851, Birds and Aircraft, and Operation Bird Strike FLC 2-0147, Bird Hazards to Aircraft Training Equipment Bird Traps (6) Animal Traps (1) Binoculars (6) Exploder, Carbide Type (12) Training Methods Discussion/Demonstration (2.5 hrs) Performance (1.5 hrs) Instructional Environment/Design Classroom (2.5 hrs) Field (1.5 hrs) Group/Lockstep Instructional Guidance Point out the difference in markings of the live snakes as well as the preserved specimens. Show how to use the bird traps. Demonstrate the different field rodent and predatory animal traps. Discuss the
d. Using technical manuals provided, state the basic control measures for vertebrates.	(.5/0)	
e. Using equipment and technical data provided, collect, identify, and record results of selected specimens of vertebrate species.	(.5/0)	
f. Practice procedures for coordination with other agencies to confirm identification, breeding habits, and appearance cycles of pests in accordance with AFM 91-16.	(.5/0)	
g. Perform review of local data and records at Base CE entomology section to determine local cyclical characteristics of pests.	(.3/0)	
h. Using reference materials provided, determine and record the injurious effects of insects and other pests.	(.2/0)	

PLAN OF INSTRUCTION (Continued)

1 UNITS OF INSTRUCTION AND CRITERION OBJECTIVES	2 DURATION (HOURS)	3 SUPPORT MATERIALS AND GUIDANCE
		importance of birds in the cases that they result in numerous aircraft strikes. Coordinate with Base CE entomology section in selecting sites for performance projects. Coordinate with Military Public Health when using calcium cyanide. Commercial Texts: A field Guide to the Mammals (B-21); Handbook for Pest Control (B-8); Snakes of the World (B-7); Diseases Transmitted from Animals to Man (B-22); U. S. Dept of Agricultural Manuals, Pamphlets, and Letters; U. S. Dept of Interior Manuals, Pamphlets and Letters.
10. Related Training (identified in course chart)	2	
11. Measurement Test and Test Critique	2 (2/0) Day 20	

PLAN OF INSTRUCTION	COURSE TITLE Entomology Specialist

BLOCK TITLE

Control of Economically Important Pests

UNITS OF INSTRUCTION AND CRITERION OBJECTIVES 1	DURATION (HOURS) 2	SUPPORT MATERIALS AND GUIDANCE 3	
1. Fumigation Techniques	8	Column 1 Reference	STS Reference
	(6/2)	1a	9a(16)
	Day 21	1b	3a, 3b, 3g, 9g(1), 9g(2), 9g(3), 9g(4), 9g(5)
a. Research references provided and correctly list the characteristics of fumigants.	(1/1)	1c	3g, 9b, 9c, 9g(1), 9g(2), 9g(3), 9g(4), 9g(5), 9k, 9l, 9m
b. Using references provided, research and correctly list the precautions to be observed in handling fumigants.	(1/1)	Instructional Materials SG 3ABR56630-III-1, Fumigation Techniques WB 3ABR56630-III-1-P1, Fumigation Techniques AFM 91-16, Military Entomology Operational Handbook	
c. Given fumigation equipment, safety equipment, and under the guidance of instructors, perform a fumigation operation in a real or simulated situation in accordance with Air Force regulations and directives.	(4/0)	CDC, Insecticides Audio Visual Aids Training Film, The Enemy Within Training Equipment Portable Fumigation Kit (12) Foot Pump Dusters (12) Safety Equipment (12) Air Sampling and Testing Equipment (12) Training Methods Discussion/Demonstration (2 hrs) Performance (4 hrs) Outside Assignments (2 hrs)	

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PLAN OF INSTRUCTION (Continued)

UNITS OF INSTRUCTION AND CRITERION OBJECTIVES	DURATION (HOURS) 2	SUPPORT MATERIALS AND GUIDANCE 3
		Instructional Environment/Design Classroom (2 hrs) Laboratory (2 hrs) Field (2 hrs) Study Hall (2 hrs) Group/Lockstep
		Instructional Guidance Stress Safety in performance of fumigation. Be sure students realize danger and their responsibilities to others. Use portable fumigation kit to demonstrate commodity fumigation. Have students set up an area to be fumigated and use portable fumigation kit for the project using aluminum phosphide as the fumigant. Closely supervise the fumigation operation. Instructor Reference: AFPCB TIM11, Hydrogen Phosphide Fumigation with Aluminum Phosphide. Outside assignment: Direct students to read SG III-1, and answer questions at the end of the SG.
2. Stored Products Pests	8 (6/2) Day 22	
a. Using furnished reference materials, correctly name the important fabric-destroying pests and describe the damage caused by each.	(.5/0)	
b. Using furnished reference materials, correctly describe the biological factors of selected stored fabric pests that must be considered in selecting and planning control measures.	(.5/.5)	

Column 1 Reference	STS Reference
2a, 2b, 2c	7b, 7c(4)(a), 7c(4)(b), 8a, 8e, 10a, 10b(1)
2d, 2e, 2f	7b, 7c(4)(c), 7c(5)(a), 7c(5)(b), 7c(5)(c), 8a 8e, 10a, 10b(1)
2g	7c(4)(a), 7c(4)(b), 7c(4)(c), 7c(5)(a), 7c(5)(b), 7c(5)(c),
2h	9g(1), 9g(2), 9g(3), 9g(4), 9g(5), 9h(1), 9h(3) 9h(10), 9h(11), 9k, 91

Instructional Materials
SG 3ABR56630-III-2, Stored Products Pests
WB 3ABR56630-III-2-P1, Stored Products Pests

PLAN OF INSTRUCTION (Continued)

UNITS OF INSTRUCTION AND CRITERION OBJECTIVES 1	DURATION (HOURS) 2	SUPPORT MATERIALS AND GUIDANCE 3
c. Using furnished reference materials, correctly list the measures for controlling fabric pests.	(.5/.5)	AFM 91-16, Military Entomology Operational Handbook CDC, Household and Stored Food Pests, Key to Stored Pests Instruction Manuals, Dispersal Equipment Audio Visual Aids Training Film: FN-9998 A, Insect Pests of Dried Food Stores, Recognition of Pests Training Equipment Stored Products Pest Specimens (12) Microscopes (1) Pesticide Dispersal Equipment (12) Portable Fumigation Kit (12) Truck, Stake and Platform, 1-1/2 Ton (12) Air Sampling and Testing Equipment (12) Dispenser, Insecticide (Dichlorvos Vapor) (12) Micron Generation Unit (ULV), Hand Carried (6) Training Methods Discussion/Demonstration (2.5 hrs) Performance (3.5 hrs) Outside Assignments (2 hrs) Instructional Environment/Design Classroom (2.5 hrs) Laboratory (1 hr) Field (2.5 hrs) Study Hall (2 hrs) Group/Lockstep
d. Using furnished reference materials, correctly name the important pests of food products and describe the damage caused by each.	(.5/0)	
e. Using furnished reference materials, describe the biological factors of selected stored food pests that must be considered in selecting and planning control measures.	(.5/.5)	
f. Using reference materials furnished, correctly list the measures for controlling stored food pests.	(.5/.5)	
g. Using identification keys and technical data, identify by correctly matching selected specimens of stored products pests to keys.	(1/0)	
h. Using equipment provided, perform control procedures in accordance with AFM 91-16, for stored products pests.	(2/0)	

PLAN OF INSTRUCTION (Continued)

UNITS OF INSTRUCTION AND CRITERION OBJECTIVES 1	DURATION (HOURS) 2	SUPPORT MATERIALS AND GUIDANCE 3
		Instructional Guidance Instruct students on proper handling of the microscopes and make sure that the students do not handle the specimens unnecessarily. State the role of medical services personnel in performing inspections. Show the flour beetles, grain beetle, rice and granary weevils, mealworms, carpet beetles, lesser grain borer, cadelle, spider beetle, khapra beetle, and cigarette beetle. Emphasize safety in the use of chemicals around food storage areas. Have students realize that only the safest chemicals can be used around storage areas. Coordinate with CE entomology section in selecting sites for performance of control measures. Commercial Texts: Destructive and Useful Insects; Handbook of Pest Control. Outside Assignment: Direct students to read SG III-2, and answer questions at the end of the SG.
3. Household Pests	10 (8/2) Days 23,24	Column 1 Reference 3a, 3b, 3c, 3d — STS Reference 7c(3)(a), 7c(3)(b), 7c(3)(c), 7c(3)(d), 7c(3)(e), 7c(3)(f), 7c(3)(g), 9i
a. Using furnished reference materials, name the important household pests and list those characteristics of each that causes it to be placed in this classification.	(1/1)	3e — 9g(3), 9g(4), 9g(5), 9h(1), 9h(2), 9h(3), 9h(9), 9h(10), 9h(11), 9i Instructional Materials SG 3ABR56630-III-3, Household Pests
b. Using provided reference materials, list the biological factors of selected household pests that must be considered in selecting and planning controls.	(1/.5)	WB 3ABR56630-III-3-P1, Household Pests AFM 91-16, Military Entomology Operational Handbook CDC, Household and Stored Food Pests Audio Visual Aids
c. Using provided reference materials, list the measures for controlling household pests.	(1/.5)	Identification Keys, Household Pests

PLAN OF INSTRUCTION (Continued)

UNITS OF INSTRUCTION AND CRITERION OBJECTIVES 1	DURATION (HOURS) 2	SUPPORT MATERIALS AND GUIDANCE 3
d. Using identification keys and specimens provided, identify by matching selected species to keys.	(1/0)	**Training Equipment** Microscopes (1) Hand Sprayers (6) Power Dusters (6) Power Sprayers (6) Truck, Stake and Platform, 1-1/2 Ton (12) Household Pest Specimens (12) **Training Methods** Discussion/Demonstration (3 hrs) Performance (5 hrs) Outside Assignment (2 hrs) **Instructional Environment/Design** Classroom (3 hrs) Laboratory (3 hrs) Field (2 hrs) Study Hall (2 hrs) Group/Lockstep **Instructional Guidance** Emphasize care in handling microscopes, lamps, and specimens. Show students American, Australian, German, and brown-banded roaches; field and mole crickets; silverfish; firebrat; and clover mite. Emphasize the importance of good manners and politeness in approaching dwelling occupants, the need for safety in job performance, and the necessity of explaining hazards to persons that may come in contact with treated areas. Coordinate with Base CE entomology section in selecting sites for performance projects. Commercial Texts: Destructive and Useful Insects (B-23); Handbook of Pest Control (B-8); ECI Course 9330, Military Medical Entomology. Outside Assignment: Day 23, direct students to read SG III-3, Household Pests, and answer questions.
e. Using selected equipment and technical guidance, perform control procedures for household pests in a real or simulated control situation.	(4/0)	

PLAN OF INSTRUCTION (Continued)

UNITS OF INSTRUCTION AND CRITERION OBJECTIVES 1	DURATION (HOURS) 2	SUPPORT MATERIALS AND GUIDANCE 3
4. **Fumigation Clearance Techniques**	6 (4/2) Day 24	Column 1 Reference: 4a, 4b STS Reference: 9a(16), 91
a. Using technical information provided, list and describe clearance procedures required for fumigation.	(1.5/1)	Instructional Materials SG 3ABR56630-III-4, Fumigation Clearance Techniques WB 3ABR56630-III-4-P1, Fumigation Clearance Techniques AFM 91-16, Military Entomology Operational Handbook
b. Given technical guidance and equipment, perform clearance procedures in a real or simulated operation in accordance with Air Force directives.	(2.5/1)	Training Equipment Portable Fumigation Kit (12) Safety Equipment (1) Air Sampling and Testing Equipment (12) Training Methods Discussion/Demonstration (1.5 hrs) Performance (2.5 hrs) Outside Assignments (2 hrs) Instructional Environment/Design Classroom (1.5 hrs) Laboratory (.5 hr) Field (2 hrs) Study Hall (2 hrs) Group/Lockstep Instructional Guidance Instruct students on the importance of proper clearance procedures. Stress safety precautions necessary in removing covering from areas being fumigated. Have students utilize safety equipment and proper

PLAN OF INSTRUCTION (Continued)

UNITS OF INSTRUCTION AND CRITERION OBJECTIVES 1	DURATION HOURS 2	SUPPORT MATERIALS AND GUIDANCE 3
		procedures for clearing the area that had been set up for fumigation operation in a previous lesson. Instructor Reference: AFPCB TIM 11, Hydrogen Phospide Fumigation with Aluminum Phosphide. Outside assignment: Day 24, direct students to read SG III-4, and answer questions at the end of the SG.
5. Structural Pests	14 (12/2) Days 25, 26	**Column 1 Reference** / **STS Reference** 5a, 5b, 5c, 5d — 7b, 7c(7)(a), 7c(7)(b), 7c(7)(c), 7c(7)(d), 7c(7)(e), 7c(7)(f), 7e
a. Using reference data provided, name and describe the important structural pests and the damage caused by each.	(1/1)	5e — 3f, 3g, 9c, 9f, 9g(3), 9h(9), 10a, 10i, 10j **Instructional Materials** SG 3ABR56630-III-5, Structural Pests
b. Using provided data, list and describe the biological factors of selected structural pests that must be considered when selecting and planning controls.	(1/1)	WB 3ABR56630-III-5-P1, Structural Pests WB 3ABR56630-III-5-P2, Assessing Structural Pest Damage AFM 91-16, Military Entomology Operational Handbook Instruction Manuals, Dispersal Equipment
c. Using the reference materials provided, list the measures for controlling structural pests.	(1/0)	**Audio Visual Aids** Training Films: MN 8167B, Wood Preservation, Control of Wood Destroying Organisms; and MN 8167A, Wood Destroying Organisms, Inspection for
d. Using identification keys and specimens, identify by matching selected specimen to keys.	(2/0)	**Training Equipment** Microscopes (1)
e. Using equipment and technical guidance, perform procedures for controlling structural pests.	(7/0)	Structural Pest Specimens (12) Subslab Injector (12) Hydraulic Sprayer (12) Rotohammer (12) Truck, Stake and Platform, 1-1/2 Ton (12)

PLAN OF INSTRUCTION (Continued)

1 UNITS OF INSTRUCTION AND CRITERION OBJECTIVES	2 DURATION (HOURS)	3 SUPPORT MATERIALS AND GUIDANCE
		Training Methods Discussion/Demonstration (3 hrs) Performance (9 hrs) Outside Assignments (2 hrs) Instructional Environment/Design Classroom (3 hrs) Laboratory (3 hrs) Field (6 hrs) Study Hall (2 hrs) Group/Lockstep Instructional Guidance Show students different examples of termites, including all different castes, as well as examples of termite damage. In inspection and control program, emphasize safety in handling chemicals, safety in running machinery, and the need for a complete control program to guard against reinfestation. Coordinate with base CE entomology section in selecting sites for performance projects. Commercial Text: Termites, Recognition and Control. Outside Assignment: Day 25, direct students to read SG III-5, Structural Pests, and answer questions.
6. Horticultural Pests	6 (6/0) Day 27	Column 1 Reference 6a, 6b, 6c, 6d — STS Reference 7b, 7c(9)(a), 7c(9)(b), 7c(9)(c), 7c(9)(d), 7c(9)(e), 7c(9)(f), 7c(9)(g), 7c(9)(h)
a. Using provided reference materials, name the important horticultural pests and describe the damage caused by each.	(1/0)	6e — 9g(1), 9g(2), 9g(3), 9g(4), 9g(5), 9h(1), 9b(3), 9h(4), 9h(5), 9h(7), 9h(9), 9h(11), 10d

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PLAN OF INSTRUCTION (Continued)

UNITS OF INSTRUCTION AND CRITERION OBJECTIVES 1	DURATION (HOURS) 2	SUPPORT MATERIALS AND GUIDANCE 3
b. Using the reference materials furnished describe the biological factors of selected horticultural pests that must be considered when selecting and planning control measures.	(1/0)	Instructional Materials SG 3ABR56630-III-6, Horticultural Pests WB 3ABR56630-III-6-P1, Horticultural Pests AFM 91-16, Military Entomology Operational Handbook Instruction Manuals, Dispersal Equipment
c. Using reference materials provided, record the measures for controlling selected horticultural pests.	(1/0)	Audio Visual Aids Training Film: TF 5747, Don't Bring Your Enemy Home
d. Using identification keys and specimens provided, identify by matching selected species of horticultural pests.	(.5/0)	Training Equipment Hand Sprayers (6) Dusters (6) Hydraulic Sprayer, Trailer Mounted (12) Granular Spreader (12) Truck, Stake and Platform, 1-1/2 Ton (12) Horticultural Pest Specimens (12)
e. Using equipment and technical guidance, perform procedures for controlling horticultural pests.	(2.5/0)	Training Methods Discussion/Demonstration (3 hrs) Performance (3 hrs) Instructional Environment/Design Classroom (3 hrs) Laboratory (1.5 hrs) Field (1.5 hrs) Group/Lockstep

PLAN OF INSTRUCTION (Continued)

UNITS OF INSTRUCTION AND CRITERION OBJECTIVES 1	DURATION (HOURS) 2	SUPPORT MATERIALS AND GUIDANCE 3
		Instructional Guidance Show student selected horticultural pests. Emphasize safety in control program. Granules are to be handled with great care. Explain equipment used in horticultural pest control. Coordinate with Base CE entomology section in selecting sites for performance projects.
7. Vegetation Control	6 (6/0) Day 28	Column 1 Reference — STS Reference 7a — 11a, 11b 7b — 11c(1), 11c(2), 11d(1), 11d(2), 11d(3), 11d(4) 11d(5), 11d(6), 11d(7), 11d(8), 11d(9), 11d(10) 11d(11) 7c — 11e, 11f, 11g, 11h 7d — 9h(3), 9h(9), 10b(3), 11e, 11f, 11g
a. Using identification keys and technical data provided, collect and identify pest vegetation species.	(1/0)	
b. Using technical references provided, classify and state the use of selected herbicides.	(1.5/0)	Instructional Materials SG 3ABR56630-III-7, Vegetation Control WB 3ABR56630-III-7-P1, Vegetation Control AFM 91-19, Herbicide Manual for Noncropland Weeds Instruction Manuals, Dispersal Equipment Identification Keys Sample Herbicide Labels
c. Using technical references provided, describe procedures for selecting, applying, and evaluating a vegetation control program.	(1.5/0)	
d. Given technical guidance and equipment, perform vegetation control on a selected problem area.	(2/0)	Training Equipment Compressed Air Sprayer (12) Hydraulic Sprayer, Trailer Mounted (12) Granule Spreader (12) Safety Equipment (12) Truck, Stake and Platform, 1-1/2 Ton (12)

PLAN OF INSTRUCTION (Continued)

1 UNITS OF INSTRUCTION AND CRITERION OBJECTIVES	2 DURATION (HOURS)	3 SUPPORT MATERIALS AND GUIDANCE
		Training Methods Discussion/Demonstration (2 hrs) Performance (4 hrs) **Instructional Environment/Design** Classroom (2 hrs) Laboratory (1 hr) Field (3 hrs) Group/Lockstep **Instructional Guidance** Coordinate with other sections as to where a weed problem requiring treatment exists. Show students weed specimens common to this base. Emphasize safety in handling of chemicals and operation of equipment. Coordinate with Base CE Management Agronomist in selecting sites for performance projects. Commercial Text: Common Weeds of the United States.
8. Specimen Laboratory Maintenance	2 (2/0) Day 29	**Column 1 Reference** 8a, 8b, 8c **STS Reference** 6a
a. Physically clean and inspect items of specimen laboratory equipment in accordance with Air Force directives.		**Instructional Materials** SG 3ABR56630-III-8, Specimen Laboratory Maintenance WB 3ABR56630-III-8-P1, Specimen Laboratory Maintenance
b. Inventory laboratory specimens to insure proper accountability in accordance with Air Force directives.	(.5/0)	**Training Equipment** Specimen Laboratory Equipment (12)

PLAN OF INSTRUCTION (Continued)

UNITS OF INSTRUCTION AND CRITERION OBJECTIVES 1	DURATION (HOURS) 2	SUPPORT MATERIALS AND GUIDANCE 3
c. Perform security check of laboratory supplies and live specimen, including snakes, in accordance with Air Force directives.	(.5/0)	Training Methods Discussion/Demonstration (.5 hr) Performance (1.5 hrs) Instructional Environment/Design Classroom (.5 hr) Laboratory (1.5) Group/Lockstep Instructional Guidance Students will properly store and secure all specimens used in training. They will clean, inspect, store and secure optical instruments and other laboratory equipment used in training. Place emphasis on reporting of damaged or missing equipment. Stress proper storage of laboratory chemicals and disposal of waste to prevent fires.

DEPARTMENT OF THE AIR FORCE
Headquarters, US Air Force
Washington DC 20330

STS 566X0
(For AFSCs 56630/50/70)
7 November 1974

ENTOMOLOGY SPECIALIST AND ENTOMOLOGY TECHNICIAN

1. Purpose of this Specialty Training Standard (STS). As prescribed in AFR 8-13 this STS:

a. States in column 1 of attachment 1 the tasks, knowledges, and study references (SR) necessary for airmen to perform duties in the Engineering Entomology ladder of the Airman Civil Engineering Sanitation Career Field. These are based on Specialty Descriptions effective 1 October 1974 in AFM 39-1.

b. Indicates in columns 2A, 3A, and 4A of attachment 1 the minimum proficiency recommended for each task or knowledge for qualification at the 3, 5, and 7 skill level AFSCs. AFM 50-23 is the authority to change the proficiency level during JPG development when the local requirement is different from the level shown in this STS.

c. Shows in column 2A of attachment 1 the proficiency attained in Course 3ABR56630 (PDS Code AJ4) described in AFM 50-5. Proficiency code for the minimum proficiency recommended for the 3 skill level AFSC and the proficiency attained in the course are the same except when dual codes are entered. When dual codes are entered the second code shows the proficiency attained in the course.

d. Provides basis for supervisors to plan and conduct individual OJT programs.

e. Provides a convenient record of on-the-job training completed when inserted in AF Form 623, "Consolidated Training Record," and maintained in accordance with AFM 50-23.

f. Defines the knowledge requirement covered by Specialty Knowledge Tests in the Weighted Airman Promotion System.

2. Proficiency Code Key. Attachment 1 contains the Proficiency Code Key used to show proficiency level.

3. Career Development Channel of OJT. Personnel training to AFSC 56630 will obtain knowledge training by using applicable study references listed in this STS. Satisfactory completion of CDC 56650 is mandatory for personnel training to AFSC 56650. Personnel training to AFSC 56670 will obtain knowledge training by using applicable study references listed in this STS, and fulfill management training requirements specified in AFM 50-23. (See ECI Catalog and Guide, chapter 3, paragraph 3-3 for current CDC identification number for ordering purposes.)

4. Study Guidance for Weighted Airman Promotion System (WAPS) and Superior Performance Proficiency Pay(SPPP) Program. Specialty Knowledge Tests (SKTs) for promotion to E-5 and Superior Performance Tests (SPTs) for SPPP are based on 5 skill level knowledge requirements. SKTs for promotion to E-6 and E-7 are based on 7 skill level knowledge requirements. SKT/SPT questions are based primarily on Career Development Courses (CDCs). However, some questions may be drawn from other references listed in this Specialty Training Standard. The CDCs for SKT/SPT study are maintained in the WAPS Study Reference Library. Other references listed should be available in the work area.

5. Recommendations. Report to ATC/TT unsatisfactory performance of individual graduates or inadequacies of this STS. Refer to specific paragraphs of the STS. See AFR 50-38.

BY ORDER OF THE SECRETARY OF THE AIR FORCE

OFFICIAL

DAVID C. JONES, General, USAF
Chief of Staff

JACK R. BENSON, Colonel, USAF
Director of Administration

2 Attachments
1. Qualitative Requirements
2. SKT/SPT Review References

Supersedes STS 566X0, 3 March 1970 and Change 1, 3 July 1972, Change 2, 4 December 1972, Change 3, 23 February 1973 and Change 4, 14 January 1974.

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THIS BLOCK IS FOR IDENTIFICATION PURPOSES ONLY		
TRAINEE		
NAME	**INITIALS** *(In Writing)*	**GRADE**
ORGANIZATION		
IMMEDIATE SUPERVISOR'S NAME AND INITIALS *(In Writing)*		
N/I	**N/I**	
N/I	**N/I**	

QUALITATIVE REQUIREMENTS

PROFICIENCY CODE KEY		
	SCALE VALUE	**DEFINITION: The Individual**
TASK PERFORMANCE LEVELS	1	Can do simple parts of the task. Needs to be told or shown how to do most of the task. (EXTREMELY LIMITED)
	2	Can do most parts of the task. Needs help only on hardest parts. May not meet local demands for speed or accuracy. (PARTIALLY PROFICIENT)
	3	Can do all parts of the task. Needs only a spot check of completed work. Meets minimum local demands for speed and accuracy. (COMPETENT)
	4	Can do the complete task quickly and accurately. Can tell or show others how to do the task. (HIGHLY PROFICIENT)
*** TASK KNOWLEDGE LEVELS**	a	Can name parts, tools, and simple facts about the task. (NOMENCLATURE)
	b	Can determine step by step procedures for doing the task. (PROCEDURES)
	c	Can explain why and when the task must be done and why each step is needed. (OPERATING PRINCIPLES)
	d	Can predict, identify, and resolve problems about the task. (COMPLETE THEORY)
**** SUBJECT KNOWLEDGE LEVELS**	A	Can identify basic facts and terms about the subject. (FACTS)
	B	Can explain relationship of basic facts and state general principles about the subject.(PRINCIPLES)
	C	Can analyze facts and principles and draw conclusions about the subject. (ANALYSIS)
	D	Can evaluate conditions and make proper decisions about the subject. (EVALUATION)

– EXPLANATIONS –

* A task knowledge scale value may be used alone or with a task performance scale value to define a level of knowledge for a specific task. (Examples: b and 1b)

** A subject knowledge scale value is used alone to define a level of knowledge for a subject not directly related to any specific task, or for a subject common to several tasks.

– This mark is used alone instead of a scale value to show that no proficiency training is provided in the course, or that no proficiency is required at this skill level.

X This mark is used alone in course columns to show that training is not given due to limitations in resources.

1. TASKS, KNOWLEDGES AND STUDY REFERENCES	PROFICIENCY LEVEL, PROGRESS RECORD AND CERTIFICATION								
	2. 3 Skill Level			3. 5 Skill Level			4. 7 Skill Level		
	A AFSC/Crs	B Date OJT Started	C Date Completed & Trainee's Supervisor's Initials	A AFSC	B Date OJT Started	C Date Completed & Trainee's Supervisor's Initials	A AFSC/Crs	B Date OJT Started	C Date Completed & Trainee's Supervisor's Initials
NOTE: Users may annotate lists of SRs to identify current references pending STS revision.									
1. AIRMAN SANITATION CAREER FIELD (AFSC 56XXX)									
SR: AFMs 26-2, 39-1 (vol II), 85-1; AFR 85-5									
a. Civil Engineer organizational structure	A			B			C		
b. Progression in career ladder 566X0	A			B			C		
c. Duties of AFSs 56630/50/70	A			B			C		
2. COMMUNICATIONS SECURITY (TRANSEC)									
SR: AFRs 205-1, 205-7									
a. Identify information as classified, unclassified, or of possible intelligence value	1b			2b			3c		
b. Determine proper classification of official information as Top Secret, Secret, Confidential or For Official Use Only	1b			2b			3c		
c. Select and recommend mode of transmission dictated by security and expediency required	1b			2b			3c		
d. Observe security precautions involved in communications	b			2b			3c		
3. ENTOMOLOGY SAFETY									
SR: AFMs 91-16, 127-101 (chap 5); AFR 91-21									
a. Hazards of pesticides	B			C			C		
b. Use personnel protective equipment during pesticide application including gloves, respirators, goggles, gas masks, and protective clothing	2b			4c			4c		
c. Clean, maintain, and store protective equipment	2b			4c			4c		
d. Practice safety while storing or transporting toxic solutions and supplies	2b			4c			4c		
e. Inspect dispersal equipment for safe operating condition	2b			3c			4c		
f. Use safe practices while operating equipment	2b			3c			4c		
g. Follow safety precautions when mixing and applying insecticides and herbicides	2b			3c			4c		
h. First aid for victims of accidental poisoning	C			D			D		

1. TASKS, KNOWLEDGES AND STUDY REFERENCES	PROFICIENCY LEVEL, PROGRESS RECORD AND CERTIFICATION								
	2. 3 Skill Level			3. 5 Skill Level			4. 7 Skill Level		
	A APSC/Crs	B Date OJT Started	C Date Completed & Trainee's Supervisor's Initials	A AFSC	B Date OJT Started	C Date Completed & Trainee's Supervisor's Initials	A AFSC/Crs	B Date OJT Started	C Date Completed & Trainee's Supervisor's Initials
4. PUBLICATIONS									
SR: AFRs 0-2, 8-2; TOs 00-5-1, 00-5-2									
a. Use indexes to locate numbers and titles of publications	1a			3c			4c		
b. Locate entomology control directives in AF standard publication system	3c			3c			4c		
c. Locate technical information in Army, Navy and commercial entomology publications	1b			3c			4c		
d. Use technical publications when performing job functions	2b			3c			4c		
e. Locate organizational and individual responsibilities for insect, rodent, and vegetation control in AF standard publications	2c			3c			4c		
f. Locate stock codes and numbers for entomology control chemicals and application equipment	1c			3c			4c		
g. Initiate requests for technical and commercial publications	-			2b			4c		
5. SUPERVISION AND TRAINING									
a. Supervision									
SR: AFMs 39-1, 50-20, 85-[illegible]; AFRs 35-1, 39-6									
(1) Evaluate performance of personnel and complete appropriate rating forms	-			2b			4c		
(2) Orient newly assigned personnel to the organization and mission of the unit and make work assignments	-			2b			4c		
(3) Initiate correspondence and maintenance operating instructions (MOIs) concerning entomology activities	1a			2b			3c		
(4) Establish priorities and schedule work assignments	-			2b			4c		
(5) Prepare and coordinate Annual Pest Control Plan	1a			3b			4c		
(6) Supervise entomology activities	-			2b			4c		
(7) Establish requirements for necessary entomology equipment, tools, and spare parts	-			2b			4c		
(8) Plan layout of pest control shop to provide areas for									
(a) Administration	1a			2b			4c		

1. TASKS, KNOWLEDGES AND STUDY REFERENCES	PROFICIENCY LEVEL, PROGRESS RECORD AND CERTIFICATION 2. 3 Skill Level A AFSC/Crs	B Date OJT Started	C Date Completed & Trainee's Supervisor's Initials	3. 5 Skill Level A AFSC	B Date OJT Started	C Date Completed & Trainee's Supervisor's Initials	4. 7 Skill Level A AFSC/Crs	B Date OJT Started	C Date Completed & Trainee's Supervisor's Initials
5a(8)(b) Safe storage of poisons	1a			2b			4c		
(c) Sprayer maintenance	1a			2b			4c		
(d) Safety showers	1a			2b			4c		
(9) Adherence to principles and requirements of federal occupational safety and environmental protection statutes and regulations									
(a) FIFRA - Federal Insecticide, Fungicide and Rodenticide Act	A			B			C		
(b) FEPCA - Federal environmental Pesticide Control Act	A			B			C		
(c) EPA - Environmental Protection Agency	A			B			C		
(d) OSHA - Occupational Safety and Health Administration	A			B			C		
b. Training									
(1) Air Force training resources, programs, and training assignment procedures	A			B			C		
SR: AFMs 50-5, 50-23; AFRs39-4, 50-9, 50-54									
(2) Recommend personnel for training	-			1b			3c		
SR: AFMs 35-8, 50-5; AFRs 39-4, 50-9, 50-12, 50-37, 50-38, 50-39, 50-54									
(3) Conduct personnel training	-			2b			4c		
SR: AFMs 39-1, 50-9, 50-23; AFR 50-12									
(4) Maintain appropriate training and certification records	-			2b			4c		
SR: AFM 50-23 (chapters 5 and 6); AFRs 91-21, 91-26									
6. PROJECT AND RESOURCE MANAGEMENT									
SR: AFM 85-1									
a. Maintain accountability of Air Force property	a			2b			3c		
b. Establish material bench stock requirement	-			2b			3c		
c. Initiate equipment requests	1a			2b			3c		
d. Equipment authorization	A			B			C		

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TASKS, KNOWLEDGES AND STUDY REFERENCES 1.	PROFICIENCY LEVEL, PROGRESS RECORD AND CERTIFICATION								
	2. 3 Skill Level			3. 5 Skill Level			4. 7 Skill Level		
	A AFSC/Crs	B Date OJT Started	C Date Completed & Trainee's Supervisor's Initials	A AFSC	B Date OJT Started	C Date Completed & Trainee's Supervisor's Initials	A AFSC/Crs	B Date OJT Started	C Date Completed & Trainee's Supervisor's Initials
6e. Work authorization documents	A			B			C		
f. Identify and report work requirements	a			2b			3c		
g. Report labor man-hours expended	a			2b			3c		
h. Use status reports to improve management of resources	-			2b			3c		
i. Coordinate work progression with interested base engineer functional activities	a			2b			3c		
7. COLLECTION AND IDENTIFICATION OF SPECIMENS ENCOUNTERED IN PEST CONTROL OPERATIONS									
SR: AFM 91-16 (chapters 7, 8, and 9)									
a. Harmful effects of pests upon mankind	B			C			C		
b. Employ effective microscope techniques	2b			3c			4c		
c. Collect and identify species of medical, economic and morale importance									
(1) Vectors of disease									
(a) Mosquitoes	2b			3c			4c		
(b) Flies	2b			3c			4c		
(c) Fleas	2b			3c			4c		
(d) Lice	2b			3c			4c		
(e) Ticks, mites, etc.	2b			3c			4c		
(2) Venomous arthropods and reptiles									
(a) Spiders	2b			3c			4c		
(b) Scorpions	2b			3c			4c		
(c) Bees, wasps, hornets, and ants	2b			3c			4c		
(d) Snakes	2b			3c			4c		
(3) Household pests									
(a) Cockroaches	2b			3c			4c		
(b) Silverfish	2b			3c			4c		
(c) Crickets	2b			3c			4c		
(d) Ants	2b			3c			4c		
(e) Earwigs	2b			3c			4c		
(f) Bedbugs	2b			3c			4c		
(g) Clovermites, etc.	2b			3c			4c		

1. TASKS, KNOWLEDGES AND STUDY REFERENCES	PROFICIENCY LEVEL, PROGRESS RECORD AND CERTIFICATION								
	2. 3 Skill Level			3. 5 Skill Level			4. 7 Skill Level		
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7c(4) Stored fabric insect pests									
(a) Clothes moths	2b			3c			4c		
(b) Carpet beetles	2b			3c			4c		
(c) Spider beetles	2b			3c			4c		
(5) Stored food insect pests									
(a) Flour moths	2b			3c			4c		
(b) Flour beetles	2b			3c			4c		
(c) Grain and seed weevils	2b			3c			4c		
(6) Commensal rodents	2b			3c			4c		
(7) Wood destroying organisms									
(a) Termites	2b			3c			4c		
(b) Powder-Post Beetles	2b			3c			4c		
(c) Old House Borer	2b			3c			4c		
(d) Lyctus and Bostrichid Beetles	2b			3c			4c		
(e) Carpenter ants and bees	2b			3c			4c		
(f) Fungus and bacterial rots	2b			3c			4c		
(8) Field rodents and predatory animals	2b			3c			4c		
(9) Pests of Ornamental and Turf									
(a) Foliage insects	2b			3c			4c		
(b) Stem and bark borers	2b			3c			4c		
(c) Chewing insects	2b			3c			4c		
(d) Snails	2b			3c			4c		
(e) Scale insects	2b			3c			4c		
(f) Sucking insects	2b			3c			4c		
(g) Lawn and turf insects	2b			3c			4c		
(h) Lawn and turf diseases	2b			3c			4c		
(10) Birds	2b			3c			4c		
d. Coordinate with other agencies to confirm identification of pests, breeding habits, and appearance cycles	2b			3c			4c		
e. Review local data and records to determine local cyclical characteristics of pests	b			3c			4c		
f. Determine injurious effects of insects and pests	2b			3c			4c		

TASKS, KNOWLEDGES AND STUDY REFERENCES 1.	PROFICIENCY LEVEL, PROGRESS RECORD AND CERTIFICATION								
	2. 3 Skill Level			3. 5 Skill Level			4. 7 Skill Level		
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8. SURVEYS, TESTS, AND PLANS FOR PEST CONTROL PROGRAMS									
SR: AFM 91-16 (chap 2); AFRs 91-21, 161-1									
a. Survey area of entomology responsibility to determine control measures needed	1b			3c			4c		
b. Perform tests to determine materials needed for control programs	1b			3c			4c		
c. Coordinate survey and proposed control program with base and civilian community medical activities	1b			2c			4c		
d. Coordinate with state and federal activities prior to large scale control operations	a			2b			3c		
e. Establish control procedures to prohibit transportation of pests from their native habitat and recommended quarantine actions	a			2b			3c		
SR: AFR 161-4									
9. CHEMICAL CONTROL OF PESTS									
SR: AFMs 91-16 (chap 3), 127-101; AFR 91-21									
a. Characteristics, availability, and safe handling of pesticides including									
(1) Sulfur group	A			C			C		
(2) Mercury group	A			C			C		
(3) Arsenic group	A			C			C		
(4) Fluorine group	A			C			C		
(5) Non-substituted hydrocarbons	A			C			C		
(6) Chlorinated hydrocarbons	A			C			C		
(7) Organic phosphorous group	A			C			C		
(8) Organic nitrogen group	A			C			C		
(9) Organic sulfur group	A			C			C		
(10) Organic thiocyanate	A			C			C		
(11) Petroleum	A			C			C		
(12) Alkaloids	A			C			C		
(13) Esters	A			C			C		

1. TASKS, KNOWLEDGES AND STUDY REFERENCES	PROFICIENCY LEVEL, PROGRESS RECORD AND CERTIFICATION								
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9a(14) Rotenoids	A			C			C		
(15) Resins	A			C			C		
(16) Fumigants	A			C			C		
(17) Anti-coagulants	A			C			C		
(18) 1080	A			C			C		
(19) Zinc phosphide	A			C			C		
(20) Dicarboxamide	A			C			C		
(21) Carbamates	A			C			C		
b. Select pesticide most effective in control of identified pests	2b			3c			4c		
c. Calculate and mix formulations needed for maximum safe control	2b			3c			4c		
d. Determine harmful effects of control solutions to human and animal population, buildings, paints, and vegetation	1b			3c			4c		
e. Select mixtures which are not harmful to buildings, paints, or domestic vegetation	1b			3c			4c		
f. Select most effective method to apply control formulation	1b			3c			4c		
g. Establish health safeguards required for selected formulation									
(1) Posting areas off limits	1b			3c			4c		
(2) Warning signs	1b			3c			4c		
(3) Protective equipment for personnel	1b			3c			4c		
(4) Protective measures for goods and materials	1b			3c			4c		
(5) Notification of affected population	1b			3c			4c		
h. Apply pesticidal chemicals using									
SR: AFM 91-16 (chap 4); AFPCB TIM 13									
(1) Hand sprayer	2b			3c			4c		
(2) Aerosol bomb	2b			3c			4c		
(3) Compressed air sprayer	2b			3c			4c		
(4) Gasoline engine sprayer	2b			3c			4c		
(5) Trailer mounted mist blower	2b			3c			4c		
(6) Mechanical aerosol generator	2b			3c			4c		
(7) Hand operated duster	2b			3c			4c		

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1. TASKS, KNOWLEDGES AND STUDY REFERENCES	PROFICIENCY LEVEL, PROGRESS RECORD AND CERTIFICATION								
	2. 3 Skill Level			3. 5 Skill Level			4. 7 Skill Level		
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9h(8) Thermal aerosol generator	2b			3c			4c		
(9) Power driven hydraulic sprayer	2b			3c			4c		
(10) ULV Generators	2b			3c			4c		
(11) Portable mist blower	2b			3c			4c		
i. Treat cracks and crevices in food handling areas	2b			3c			4c		
j. Aerial dispersal of pest control formulations	B			C			C		
SR: AFMs 91-16 (chap 4, sec 2); AFR 91-22; AFPCM TIM 11									
k. Applies in-transit fumigation with aluminum phosphide	2b			3c			4c		
l. Understands procedure for in-place fumigation (Atmospheric)	2b			3c			4c		
m. Fumigation chambers	A			C			C		
n. Maintain records of chemicals used and areas treated	2b			3c			4c		
o. Submit required reports of chemicals used	1a			3c			4c		
p. Survey treated areas to determine effectiveness of formulations and methods of application	2b			3c			4c		
10. PREVENTIVE PEST CONTROL									
SR: AFM 91-16; AFR 91-21									
a. Inspect area of entomology responsibility for conditions conducive to pest breeding or infestation	2b			3c			4c		
b. Notify responsible civil engineering function of corrective actions required in relation to									
(1) Sanitation	1b			3c			4c		
(2) Drainage of water areas	1b			3c			4c		
(3) Control of undesirable vegetation	1b			3c			4c		
(4) Pest proofing of buildings and materials storage areas	1b			3c			4c		
c. Treat water areas for pest control	1b			3c			4c		
d. Treat vegetation for pest control	1b			3c			4c		
e. Trap rodents and destructive predatory animals	1b			3c			4c		
f. Set poison baits for rodents and destructive animals	1b			3c			4c		
g. Establish measures to control venomous insects and reptiles	1b			3c			4c		

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1. TASKS, KNOWLEDGES AND STUDY REFERENCES	PROFICIENCY LEVEL, PROGRESS RECORD AND CERTIFICATION								
	2. 3 Skill Level			3. 5 Skill Level			4. 7 Skill Level		
	A AFSC/Crs	B Date OJT Started	C Date Completed & Trainee's Supervisor's Initials	A AFSC	B Date OJT Started	C Date Completed & Trainee's Supervisor's Initials	A AFSC/Crs	B Date OJT Started	C Date Completed & Trainee's Supervisor's Initials
10h. Establish measures to control birds	1b			3c			4c		
i. Treat structures for termite and wood destructive pest infestation	2b			3c			4c		
j. Treat soils for subterranean termites and other pests	2b			3c			4c		
11. IDENTIFICATION AND CONTROL OF VEGETATION									
SR: AFMs 91-19, 127-101 (chap 5); AFR 91-26									
a. Growth habits and reproductions of plants	A			B			C		
b. Collect and identify obnoxious plant species	1b			2b			3c		
c. Classification of herbicides									
(1) Selective and nonselective chemicals	A			B			C		
(2) Contact, translocated, and soil-sterilant chemicals	A			B			C		
d. Chemical, physical, biological properties, and safe handling of herbicides, such as									
(1) Amitrole	A			B			C		
(2) Amitrole-T	A			B			C		
(3) Organic arsenicals	A			B			C		
(4) Dalapon	A			B			C		
(5) Dinitro compounds	A			B			C		
(6) Diquat	A			B			C		
(7) Fumigants	A			B			C		
(8) Hydrocarbons, including chlorinated hydrocarbons	A			B			C		
(9) Phenoxy compounds	A			B			C		
(10) Phenylurea compounds	A			B			C		
(11) Triazines	A			B			C		
e. Select herbicides for control of vegetation	1b			3c			4c		
f. Calculate and mix herbicidal formulations	1b			3c			4c		
g. Apply herbicides for vegetation control	1b			3c			4c		
h. Make follow-up studies and evaluate vegetation control measures	1b			3c			4c		

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1. TASKS, KNOWLEDGES AND STUDY REFERENCES	PROFICIENCY LEVEL, PROGRESS RECORD AND CERTIFICATION								
	2. 3 Skill Level			3. 5 Skill Level			4. 7 Skill Level		
	A AFSC/Crs	B Date OJT Started	C Date Completed & Trainee's Supervisor's Initials	A AFSC	B Date OJT Started	C Date Completed & Trainee's Supervisor's Initials	A AFSC/Crs	B Date OJT Started	C Date Completed & Trainee's Supervisor's Initials
12. MAINTENANCE OF EQUIPMENT									
SR: AFMs 67-1 (vol 4), 85-1 (chap 5), 91-16 (chap 4); FSCs 2300, 3700, 5100, 6500, 6600, 6800; TA 483; TO 0-1-47									
a. Perform preoperation inspection of powered equipment including									
(1) Thermal fog generators	2b			3c			4c		
(2) Turbine mist-dust blowers	2b			3c			4c		
(3) Power driven hydraulic sprayers	2b			3c			4c		
(4) Power driven and hand operated dusters	2b			3c			4c		
(5) Compressed air sprayers	2b			3c			4c		
b. Perform organizational and field maintenance on equipment to include									
(1) Cleaning	2b			3c			4c		
(2) Servicing with fuel and oil	2b			3c			4c		
(3) Carburetor adjustments and component replacement	1b			3c			4c		
(4) Ignition system adjustments and component replacement	1b			3c			4c		
(5) Pump hose and tank maintenance	1b			3c			4c		
(6) Control valve maintenance and replacement	1b			3c			4c		
(7) Calibrate and adjust mixing mechanisms, nozzles and pressure settings	1b			3c			4c		
(8) Replace and/or adjust drive belts, gauges, hoses, strainers, and gaskets	1b			3c			4c		
(9) Replace and/or repair parts of spray guns such as									
(a) Nozzle tips	1b			3c			4c		
(b) Washers	1b			3c			4c		
(c) Packing	1b			3c			4c		
(d) Gaskets	1b			3c			4c		
c. Maintain equipment operating and maintenance forms and records	1b			3c			4c		

SKT/SPT REVIEW REFERENCES

1. This attachment identifies review references for the Specialty Knowledge Test (SKT) under the Weighted Airman Promotion System (WAPS) and the Superior Performance Test (SPT) for grade E-3 personnel under the Superior Performance Proficiency Pay (SPPP) program. The basic information needed for the SKT/SPT is covered in the Career Development Course (CDC). Other references are cited when the CDC requires supplementation to ensure currency and completeness of coverage or where no CDC exists. The attachment identifies the specific career field ladder by AFSCs and its associated Air Force Personnel Tests (AFPTs) by AFPT number.

2. Reference listings are limited to the basic reference. Amendments, revisions, and changes are considered a part of the basic reference. If publications are superseded or replaced by other publications, the latter should be regarded as part of the review references.

AFSCs: 56630/50/70 - Entomology Specialist/Technician

AFPTs: 56640/50/60/70

	FOR	FOR PROMOTION TO		
REVIEW REFERENCES	SPPP*	E-5	E-6	E-7
** CDC 56650	X	X	X	X
AFM 85-1				
Chapters 1, 4, 9, and 12			X	
Chapters 1, 4, 6, 11, 12, and 14				X
AFM 91-16				
Chapters 1, 2, 3, 4, 6, 7, 8, and 9			X	
Chapters 1, 3, 4, 6, 7, 8, and 9				X

* Airmen in grade E-3 will take the SPT and/or PFE for Superior Performance Proficiency Pay (SPPP) qualification.

**See index of ECI study reference material for the applicable WAPS testing cycle.

LESSON PLAN (Part I, General)

APPROVAL OFFICE AND DATE STC 2 JUN 1975	INSTRUCTOR
COURSE NUMBER 3ABR56630	COURSE TITLE Entomology Specialist
BLOCK NUMBER I	BLOCK TITLE Entomology Fundamentals, Pesticides and Equipment

LESSON TITLE
Basic Principles of Pest Control (Day 1)

LESSON DURATION

CLASSROOM/Laboratory 2 Hrs	Complementary	TOTAL 2 Hrs

POI REFERENCE

PAGE NUMBER 3	PAGE DATE 15 May 1975	PARAGRAPH 2

STS/CTS REFERENCE

NUMBER STS 566X0	DATE 7 November 1974

SUPERVISOR APPROVAL

SIGNATURE	DATE	SIGNATURE	DATE

PRECLASS PREPARATION

EQUIPMENT LOCATED IN LABORATORY	EQUIPMENT FROM SUPPLY	CLASSIFIED MATERIAL	GRAPHIC AIDS AND UNCLASSIFIED MATERIAL
None	None	None	SG 3ABR56630-I-2 WB 3ABR56630-I-2-P1 AFM 91-16 AFR 91-21

CRITERION OBJECTIVES AND TEACHING STEPS

2a. Using reference data, describe nine basic principles employed by pest control agencies in accomplishment of pest control operations.

(1) Population Management
(2) Natural controls
(3) Applied controls
(4) Legal controls
(5) Sanitation
(6) Mechanical
(7) Biological
(8) Chemical
(9) Proper construction for pest exclusion

2b. List the six steps necessary in planning a sound pest control program in accordance with AFM 91-16.

(1) Survey area of responsibility

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LESSON PLAN (Part I, General) CONTINUATION SHEET

CRITERION OBJECTIVES AND TEACHING STEPS (Continued)

(2) Review cyclical data on pest occurrence
(3) Coordinate operations with other concerned activities
(4) Select control method as early as possible
(5) Schedule of periodic evaluations
(6) Maintain records and reports

LESSON PLAN (Part I, General)

APPROVAL OFFICE AND DATE ETC 2 JUN 1975	INSTRUCTOR
COURSE NUMBER 3ABR56630	COURSE TITLE Entomology Specialist
BLOCK NUMBER I	BLOCK TITLE Entomology Fundamentals, Pesticides, and Equipment

LESSON TITLE
Sanitation in Control of Pests (Day 1)

LESSON DURATION		
CLASSROOM/Laboratory 1 hr	Complementary	TOTAL 1 hr

POI REFERENCE		
PAGE NUMBER 4	PAGE DATE 15 May 1975	PARAGRAPH 3

STS/CTS REFERENCE	
NUMBER STS 566X0	DATE 7 November 1974

SUPERVISOR APPROVAL

SIGNATURE	DATE	SIGNATURE	DATE

PRECLASS PREPARATION

EQUIPMENT LOCATED IN LABORATORY	EQUIPMENT FROM SUPPLY	CLASSIFIED MATERIAL	GRAPHIC AIDS AND UNCLASSIFIED MATERIAL
None	None	None	SG 3ABR56630-I-3 WB 3ABR56630-I-3-P1 AFM 91-16 CDC Manual, Sanitation in the Control of Insects and Rodents FLC 18-44 TF8-1672

CRITERION OBJECTIVES AND TEACHING STEPS

3a. Using reference material, describe the importance of sanitation in the control of insect and rodent pests

(1) Definition of sanitation
(2) Role of sanitation in ecology
(3) Sanitation as a control measure
(4) Responsibilities for sanitation

3b. Given reference material, list three phases of refuse handling

(1) Storage
(2) Collection
(3) Disposal

3c. Using reference data, list three types of refuse disposal

(1) Open dump
(2) Incineration

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LESSON PLAN (Part I, General) CONTINUATION SHEET

CRITERION OBJECTIVES AND TEACHING STEPS (Continued)

(3) Sanitary landfill

LESSON PLAN (Part I, General)

APPROVAL OFFICE AND DATE ETC 2 JUN 1975 Sanders	INSTRUCTOR
COURSE NUMBER 3ABR56630	COURSE TITLE Entomology Specialist
BLOCK NUMBER I	BLOCK TITLE Entomology Fundamentals, Pesticides, and Equipment

LESSON TITLE
Field Ecology (Day 2)

LESSON DURATION

CLASSROOM/Laboratory 6 Hrs	Complementary	TOTAL 6 Hrs

POI REFERENCE

PAGE NUMBER 5	PAGE DATE 15 May 1975	PARAGRAPH 4

STS/CTS REFERENCE

NUMBER STS 566X0	DATE 7 November 1974

SUPERVISOR APPROVAL

SIGNATURE	DATE	SIGNATURE	DATE

PRECLASS PREPARATION

EQUIPMENT LOCATED IN LABORATORY	EQUIPMENT FROM SUPPLY	CLASSIFIED MATERIAL	GRAPHIC AIDS AND UNCLASSIFIED MATERIAL
None	None	None	SG 3ABR56630-I-4 WB 3ABR56630-I-4-P1 AFM 91-16 Training Film: HB PMB/2-54-8

CRITERION OBJECTIVES AND TEACHING STEPS

4a. Using selected references, explain and list the ecosystem views of biology as they relate to entomology operations

(1) Interdependence of organisms in the biosphere
(2) Effects of environmental change on communities
(3) Man's role in the biosphere

4b. Using reference materials, list the methods for reducing environmental damage and health hazards of pesticides

(1) Area survey of entomology responsibility to determine control measures
(2) Coordination with base medical activity
(3) Coordination with state and federal agencies prior to large scale control operations

c. Through use of a field trip, locate and record the effects of pesticides on the environment

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LESSON PLAN (Part I, General) CONTINUATION SHEET

CRITERION OBJECTIVES AND TEACHING STEPS (Continued)

(1) Maintenance of ecosystems desired by man.
(2) Ecosystem damage
(3) Pesticide resistance
(4) Methods of determining pesticide toxicity
(5) Effects of pesticides on human health

LESSON PLAN (Part I, General)

APPROVAL OFFICE AND DATE ETC 2 JUN 1975	INSTRUCTOR
COURSE NUMBER 3ABR56630	COURSE TITLE Entomology Specialist
BLOCK NUMBER I	BLOCK TITLE Entomology Fundamentals, Pesticide and Equipment

LESSON TITLE
Epidemiology of Vector-Borne Diseases (Day 3)

LESSON DURATION

CLASSROOM/Laboratory	Complementary	TOTAL
4 hrs		4 hrs

POI REFERENCE

PAGE NUMBER	PAGE DATE	PARAGRAPH
6	15 May 1975	5

STS/CTS REFERENCE

NUMBER	DATE
STS 566X0	7 November 1974

SUPERVISOR APPROVAL

SIGNATURE	DATE	SIGNATURE	DATE

PRECLASS PREPARATION

EQUIPMENT LOCATED IN LABORATORY	EQUIPMENT FROM SUPPLY	CLASSIFIED MATERIAL	GRAPHIC AIDS AND UNCLASSIFIED MATERIAL
None	None	None	SG 3ABR56630-I-5 WB 3ABR56630-I-5-P1 AFM 91-16 CDC,Epidemiology and Control of Vector-Borne Diseases Training Film: M-542

CRITERION OBJECTIVES AND TEACHING STEPS

5a. Using reference materials, research and list the host-parasite and host-vector relationships involved in the transmission of diseases.

(1) Definitions of terms
(2) Cycles of disease transmission
(3) Methods of vectoring diseases
(4) Importance of knowledge of vector ecology

5b. Using selected materials, locate and list the arthropod vectors of disease and techniques of control of vector-borne disease

(1) Measures affecting host-parasite relationship
(2) Measures affecting host-parasite-vector relationship
(3) Measures affecting host-parasite-vector-reservoir relationship
(4) Surface dispersal of chemicals
(5) Aerial dispersal of chemicals

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LESSON PLAN (Part I, General)

APPROVAL OFFICE AND DATE ETC 2 JUN 1975	INSTRUCTOR
OURSE NUMBER 3ABR56630	COURSE TITLE Entomology Specialist
BLOCK NUMBER I	BLOCK TITLE Entomology Fundamentals, Pesticides & Equipment

LESSON TITLE
Pesticide Classification and Characteristics (Days 3 and 4)

LESSON DURATION

CLASSROOM/Laboratory	Complementary	TOTAL
6 Hrs		6 Hrs

POI REFERENCE

PAGE NUMBER	PAGE DATE	PARAGRAPH
7	15 May 1975	6

STS/CTS REFERENCE

NUMBER	DATE
STS 566X0	7 November 1974

SUPERVISOR APPROVAL

SIGNATURE	DATE	SIGNATURE	DATE

PRECLASS PREPARATION

EQUIPMENT LOCATED IN LABORATORY	EQUIPMENT FROM SUPPLY	CLASSIFIED MATERIAL	GRAPHIC AIDS AND UNCLASSIFIED MATERIAL
None	None	None	SG 3ABR56630-I-6 WB 3ABR56630-I-6-P1 AFM 91-16 CDC Manual, Insecticides CDC Manual, Rodent Eradication & Poisoning Programs Training Film:M204

CRITERION OBJECTIVES AND TEACHING STEPS

6a. Using assigned reference material, determine and list general methods of classifying pesticides

(1) Modes of entry
(2) Stage of insect acted upon
(3) Species of pest to be treated

6b. Using technical data, research and list characteristics of commonly used pesticides as prescribed by the instructor.

(1) Modes of action
(2) Chemical groups
(3) Physical properties
(4) Toxicities

c. Using assigned technical materials determine and list harmful effects of pesticides on humans, animals, buildings and vegetation.

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LESSON PLAN (Part I, General) CONTINUATION SHEET

CRITERION OBJECTIVES AND TEACHING STEPS (Continued)

(1) Characteristics of toxicity
(2) Toxicity ranges according to LD_{50} Factor
(3) Dangers to humans and other animals
(4) Effects on buildings and vegetation

6d. Using reference materials, research and indicate pesticides which are not harmful to buildings, paints, or domestic vegetation.

LESSON PLAN (Part I, General)

APPROVAL OFFICE AND DATE CETC 2 JUN 1975	**INSTRUCTOR**
COURSE NUMBER 3ABR56630	**COURSE TITLE** Entomology Specialist
BLOCK NUMBER I	**BLOCK TITLE** Entomology Fundamentals, Pesticides, and Equipment

LESSON TITLE
Pesticide Safety (Days 4 and 5)

LESSON DURATION

CLASSROOM/Laboratory	Complementary	TOTAL
4 hrs		4 hrs

POI REFERENCE

PAGE NUMBER	PAGE DATE	PARAGRAPH
8	15 May 1975	7

STS/CTS REFERENCE

NUMBER	DATE
STS 566X0	7 November 1974

SUPERVISOR APPROVAL

SIGNATURE	DATE	SIGNATURE	DATE

PRECLASS PREPARATION

EQUIPMENT LOCATED IN LABORATORY	EQUIPMENT FROM SUPPLY	CLASSIFIED MATERIAL	GRAPHIC AIDS AND UNCLASSIFIED MATERIAL
None	None	None	SG 3ABR56630-I-7 WB 3ABR56630-I-7-P1 AFM 91-16 AFR 91-21

CRITERION OBJECTIVES AND TEACHING STEPS

7a. Using reference materials, list and explain the hazards of acute exposure to various pesticides as indicated by the instructor

(1) Stomach poisons
(2) Contact poisons
(3) Respiratory poisons

7b. Given a specific pest control situation, identify and list protective equipment and clothing as required for the situation

(1) Mixing
(2) Applying

7c. Using reference materials, list the first aid procedures for victims of accidental poisoning

(1) General symptoms

LESSON PLAN (Part I, General) CONTINUATION SHEET

CRITERION OBJECTIVES AND TEACHING STEPS (Continued)

(2) Dermal poisoning
(3) Oral poisoning
(4) Fumigants
(5) Availability and use of antidotes

7d. Using prescribed materials and procedures, inspect, clean and store protective equipment and clothing.

(1) Non corrosive cleaning materials
(2) Respirator cartridge replacement procedures

7e. Using AFM 91-16 and related references, locate and list the safety precautions to observe when mixing and applying pesticides and herbicides.

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LESSON PLAN (Part I, General)

APPROVAL OFFICE AND DATE 3ETC 2 JUN 1975	INSTRUCTOR
COURSE NUMBER 3ABR56630	COURSE TITLE Entomology Specialist
BLOCK NUMBER I	BLOCK TITLE Entomology Fundamentals, Pesticides and Equipment

LESSON TITLE
Safe Disposal of Pesticides (Day 5)

LESSON DURATION

CLASSROOM /Laboratory 1 hr	Complementary	TOTAL 1 hr

POI REFERENCE

PAGE NUMBER 9	PAGE DATE 15 May 1975	PARAGRAPH 8

STS/CTS REFERENCE

NUMBER STS 566X0	DATE 7 November 1974

SUPERVISOR APPROVAL

SIGNATURE	DATE	SIGNATURE	DATE

PRECLASS PREPARATION

EQUIPMENT LOCATED IN LABORATORY	EQUIPMENT FROM SUPPLY	CLASSIFIED MATERIAL	GRAPHIC AIDS AND UNCLASSIFIED MATERIAL
None	None	None	SG 3ABR56630-I-8 WB 3ABR56630-I-8-P1

CRITERION OBJECTIVES AND TEACHING STEPS

8a. Using reference materials, determine and list the general methods of pesticide disposal.

8b. Using available directives and data, determine and list available methods for disposal of empty pesticide containers and surplus pesticides.

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LESSON PLAN (Part I, General)

APPROVAL OFFICE AND DATE TCETC 2 JUN 1975	INSTRUCTOR
COURSE NUMBER 3ABR56630	COURSE TITLE Entomology Specialist
BLOCK NUMBER I	BLOCK TITLE Entomology Fundamentals, Pesticides and Equipment

LESSON TITLE
Chemical Laboratory and Storage Maintenance (Day 5)

LESSON DURATION

CLASSROOM/Laboratory	Complementary	TOTAL
3 Hrs		3 Hrs

POI REFERENCE

PAGE NUMBER	PAGE DATE	PARAGRAPH
10	15 May 1975	9

STS/CTS REFERENCE

NUMBER	DATE
STS 566X0	7 November 1974

SUPERVISOR APPROVAL

SIGNATURE	DATE	SIGNATURE	DATE

PRECLASS PREPARATION

EQUIPMENT LOCATED IN LABORATORY	EQUIPMENT FROM SUPPLY	CLASSIFIED MATERIAL	GRAPHIC AIDS AND UNCLASSIFIED MATERIAL
Cleaning and Disposal Equipment	None	None	SG 3ABR56630-I-9 WB 3ABR56630-I-9-P1 AFM 91-16 AFR 91-21

CRITERION OBJECTIVES AND TEACHING STEPS

9a. Using technical guidance provided, list the requirements for maintaining a safe storage area and inspect course storage area for compliance with requirements to include:

(1) Ventilation
(2) Lighting Fixtures
(3) Security of storage
(4) Safety equipment
(5) Inventories

9b. With technical guidance provided, clean equipment to conform to ground safety and fire directives

9c. Perform cleaning and storage procedures on articles of safety equipment and poison storage area in accordance with AFM 91-16 and AFR 91-21.

LESSON PLAN (Part I, General)

APPROVAL OFFICE AND DATE W. H. Sanders STC 9 JUN 1975	INSTRUCTOR
COURSE NUMBER 3ABR56630	COURSE TITLE Entomology Specialist
BLOCK NUMBER I	BLOCK TITLE Entomology Fundamentals, Pesticides, & Equipment

LESSON TITLE
Hand-Powered Dispersal Equipment (Day 6)

LESSON DURATION

CLASSROOM/Laboratory	Complementary	TOTAL
6 hrs		6 hrs

POI REFERENCE

PAGE NUMBER	PAGE DATE	PARAGRAPH
11	15 May 1975	10

STS/CTS REFERENCE

NUMBER	DATE
STS 566X0	7 November 1974

SUPERVISOR APPROVAL

SIGNATURE	DATE	SIGNATURE	DATE

PRECLASS PREPARATION

EQUIPMENT LOCATED IN LABORATORY	EQUIPMENT FROM SUPPLY	CLASSIFIED MATERIAL	GRAPHIC AIDS AND UNCLASSIFIED MATERIAL
Pistol sprayer Hand dusters (Bulb) Hand plunger duster Foot pump duster Rotary duster Siphon atomizer Compressed Air Sprayer	Truck, staked platform 1½ ton		SG 3ABR56630-I-10 WB 3ABR56630-I-10-P1 AFM 91-16 Equipment Operation and Maintenance Instructions CDC, Insecticide Application Equipment for the control of Insects of Public Health Importance

CRITERION OBJECTIVES AND TEACHING STEPS

10a. Given hand-powered dispersal equipment, identify and list uses of important hand dispersal equipment used in pest control operations.

(1) Compressed air sprayer
(2) Rotary duster
(3) Foot pump duster
(4) Bulb duster
(5) Hand plunger duster
(6) Siphon atomizer
(7) Pistol sprayer

10b. Using appropriate technical manuals and instructions, perform preoperational inspection and servicing of hand dispersal equipment.

10c. Using technical manuals, tools and parts provided, accomplish minor repairs, as necessary, to include replacement of parts

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LESSON PLAN (Part I, General) CONTINUATION SHEET

CRITERION OBJECTIVES AND TEACHING STEPS (Continued)

(1) Pump parts
(2) Nozzle assemblies and parts
(3) Plumbing and hoses
(4) Tanks and hoppers

10d. Using appropriate technical manuals, calibrate and operate hand-powered dispersal equipment in real or simulated pest control situations, using inert materials rather than toxins in case of a simulated problem.

(1) Hand sprayers
(2) Hand dusters

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LESSON PLAN (Part I, General)

APPROVAL OFFICE AND DATE TCETC 2 JUN 1975	INSTRUCTOR
COURSE NUMBER ABR56630	COURSE TITLE Entomology Specialist
BLOCK NUMBER I	BLOCK TITLE Entomology Fundamentals, Pesticides and Equipment

LESSON TITLE
Power Driven Dispersal Equipment (Days 7, 8, 9 & 10)

LESSON DURATION

CLASSROOM/Laboratory	Complementary	TOTAL
20 Hrs	4 Hrs	24 Hrs

POI REFERENCE

PAGE NUMBER	PAGE DATE	PARAGRAPH
12	15 May 1975	11

STS/CTS REFERENCE

NUMBER	DATE
STS 566X0	7 November 1974

SUPERVISOR APPROVAL

SIGNATURE	DATE	SIGNATURE	DATE

PRECLASS PREPARATION

EQUIPMENT LOCATED IN LABORATORY	EQUIPMENT FROM SUPPLY	CLASSIFIED MATERIAL	GRAPHIC AIDS AND UNCLASSIFIED MATERIAL
ECO Thermal Fogger urtis Dyna-Fogger Mechanical Aerosol Generators Back-Pack Mister-Duster Micron Generation Unit (ULV), Hand Carried Dispenser, Insecticide (Dichlorvos Vapor) (over)	Truck, Stake and Platform 1½ ton	None	Training Film M-442 SG 3ABR56630-I-11 WB 3ABR56630-I-11-P1 AFM 91-16 TO 38G2-102-2 TO 38G2-102-4 TM5-3740-200-15 TM5-3740-200-025P (over)

CRITERION OBJECTIVES AND TEACHING STEPS

11a. Using appropriate technical manuals and checklists, perform preoperational inspection and servicing of power driven dispersal equipment assigned by the instructor.

(1) Thermal fog generators
(2) Turbine mist-dust blowers
(3) Power driven hydraulic sprayers
(4) Mechanical aerosol generators
(5) Portable mist-dust blowers

11b. Using technical manuals, tools, and parts, clean and accomplish repairs, as necessary to include replacement and/or adjustment of component parts.

(1) Drive belts
(2) Control valves and assemblies
(3) Calibrating devices
(4) Pumps

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LESSON PLAN (Part I, General) CONTINUATION SHEET

CRITERION OBJECTIVES AND TEACHING STEPS (Continued)

PRECLASS PREPARATION

EQUIPMENT LOCATED IN LABORATORY

Vehicle mounted mist-dust blower
Hydraulic sprayers, skid mounted and trailer mounted
Truck, Stake and Platform, 1½ Ton
Exploder, Carbide type

GRAPHIC AIDS AND UNCLASSIFED MATERIAL

AFPCB TIM No 13, Ultra Low Volume Dispersal of Insecticides by Ground Equipment
CDC, Insecticide Application Equipment for the Control of Insects of Public Health Importance
Training Film: TFM-442

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(5) Engine fuel and ignition system components
(6) Small engines and motors
(7) Plumbing and hoses
(8) Pressure gauges and other instruments
(9) Spray and fog nozzles and assemblies
(10) Switches and other control devices

11c. Using appropriate technical manuals and checklists, calibrate and operate all types of power driven dispersal equipment (in course inventory) in simulated pest control situations, using inert materials rather than toxins.

(1) Mist-dust blowers, vehicle mounted and portable
(2) Hydraulic sprayers, vehicle mounted and portable
(3) Aerosol generators, thermal and mechanical, vehicle mounted and portable

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LESSON PLAN (Part I, General)

APPROVAL OFFICE ETC 2 JUN 1975	**INSTRUCTOR**
COURSE NUMBER 3ABR56630	**COURSE TITLE** Entomology Specialist
BLOCK NUMBER I	**BLOCK TITLE** Entomology Fundamentals, Pesticides and Equipment

LESSON TITLE
Selection of Proper Pest Control Methods (Day 10)

LESSON DURATION

CLASSROOM/Laboratory	Complementary	TOTAL
2 Hrs	2 Hrs	4 Hrs

POI REFERENCE

PAGE NUMBER	PAGE DATE	PARAGRAPH
14	15 May 1975	12

STS/CTS REFERENCE

NUMBER	DATE
STS 566X0	7 November 1974

SUPERVISOR APPROVAL

SIGNATURE	DATE	SIGNATURE	DATE

PRECLASS PREPARATION

EQUIPMENT LOCATED IN LABORATORY	EQUIPMENT FROM SUPPLY	CLASSIFIED MATERIAL	GRAPHIC AIDS AND UNCLASSIFIED MATERIAL
None	None	None	SG 3ABR56630-I-12 WB 3ABR56630-I-12-P1 AFM 91-16

CRITERION OBJECTIVES AND TEACHING STEPS

12. Given a pest control problem situation and reference materials, select and list the best nonchemical permanent type control that can be taken, or if necessary, the proper chemical method that would be used.

ATC FORM AUG 72 770

Department of Civil Engineering Training

Entomology Specialist

ENTOMOLOGY FUNDAMENTALS, PESTICIDES, AND EQUIPMENT

July 1975

SHEPPARD AIR FORCE BASE

Designed For ATC Course Use

DO NOT USE ON THE JOB

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This supersedes SG 3ABR56630-I-1 thru -12, 17 September 1973
(Copies of the superseded publication may be used until stock is exhausted.)

SG 3ABR56630-I-2
September 1973

BASIC PRINCIPLES OF PEST CONTROL

Day 1

OBJECTIVE

Upon completion of this study assignment, the student will have an adequate understanding of pest control principles, programming, operations and regulations.

INTRODUCTION

This section is of great importance as it is the encompassing framework of the work performed in this career field. It presents the principles that are used throughout the field.

STUDY ASSIGNMENT

AFM 91-16, Chapter 2

QUESTIONS

1. List six types of applied pest control.
2. List the steps in a sound pest control program.

SHEPPARD AIR FORCE

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SANITATION IN THE CONTROL OF PESTS

Day 1

OBJECTIVE

The objective is to emphasize the importance of proper sanitary techniques and procedures in an effective insect and rodent control program.

INTRODUCTION

Sanitation is the most important principle in the control of flies, mosquitoes, and rodents in urban areas. A program of effective sanitation will greatly reduce pest population, thus simplifying pest control work.

STUDY ASSIGNMENT

1. AFM 91-16, Chapter 2
2. CDC (Center for Disease Control): Sanitation in the Control of Insects and Rodents

QUESTIONS

1. What are the preliminary considerations in planning for a sanitary landfill?
2. Name two most acceptable methods of refuse disposal.

SG 3ABR56630-I-4
September 1973

FIELD ECOLOGY

Day 2

OBJECTIVE

The role of pest control in ecology is of prime importance in today's everchanging environment. Field ecology is essential to the basic understanding of the interrelationships between pest control and the environment.

INTRODUCTION

Field ecology is a constantly changing science which deals with man's effects on his own environment. Pest control is an important means by which the environment can be changed either for the better or worse. It is our responsibility to see that it is changed for the better.

STUDY ASSIGNMENT

1. AFM 91-16, Chapter 6, pages 6-5 to 6-8
2. CDC: Resistance

QUESTIONS

1. Name two federal agencies with which pest control programs should be coordinated.
2. Describe the importance of proper application of pesticides.

SG 3ABR56630-I-5
September 1973

EPIDEMIOLOGY OF VECTOR-BORNE DISEASES

Day 3

OBJECTIVE

The objective is to explain, in detail, the science of epidemiology and medical entomology, and its pertinence to the entomology specialty.

INTRODUCTION

Entomology workers must have an appreciation of the complicated interrelationships of the factors in disease cycles in order to apply control measures intelligently. This study guide has been organized with sections on epidemiology, reservoir, parasite, vector, host, the host-parasite relationship and control.

STUDY ASSIGNMENT

1. AFM 91-16, Chapter 1, Section 1
2. CDC: Epidemiology and Control of Vector-borne Diseases

QUESTIONS

1. Name four sources of disease infection.
2. Name three orders of arthropod vectors of disease.
3. List the types of biological transmission.
4. Define symbiosis.

PESTICIDE CLASSIFICATION AND CHARACTERISTICS

Days 3 & 4

OBJECTIVE

Upon completion of this study guide, you will be able to classify some of the more commonly used pesticides.

INTRODUCTION

This lesson will enable you to select the proper pesticide for a particular pest based upon a combination of information about the pest and the pesticide. The engineering entomologist will be able to determine the toxicity and other characteristics of a given pesticide and understand the reason for selection of the pesticide of choice.

STUDY ASSIGNMENT

1. AFM 91-16, Chapter 3
2. CDC: Insecticides for the Control of Insects of Public Health Importance

QUESTIONS

1. List two most commonly used insecticide groups.
2. List the basic types of formulations.
3. Define LD_{50}.

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PESTICIDE SAFETY

Day 4, 5

OBJECTIVE

Upon completion of this study guide assignment, you should be able to state safety precautions used when handling pesticides and be able to describe first aid procedures for victims of accidental poisoning. You should also be able to list the precautions for protection the operator and protecting others during pesticide application.

INTRODUCTION

This lesson will enable the student to use pesticides safely for the protection of himself, his coworkers, and others. He will also be able to help a victim of accidental poisoning by pesticides. If an effective pest control program is also to be a safe program, precautions must be observed. These principles will enable the engineering entomologist to perform his duties in a safe manner.

STUDY ASSIGNMENT

1. AFM 91-16, Chapter 6.

2. SG 54, 55, 56, Safety - All Courses (Section 3)

QUESTIONS

1. List necessary items of safety equipment for pest control activities.

2. Describe the steps in treatment of respiratory poisoning.

3. List the basic precautions in handling pesticides.

SG 3ABR56630-I-8
September 1973

SAFE DISPOSAL OF PESTICIDES

Day 5

Objective

When you have completed the study guide for this day's lesson, you will be able to list the accepted methods of pesticide and pesticide container disposal.

INTRODUCTION

The pest controller must insure not only his own safety but also the safety of others. The safe disposal of pesticides and their containers will help to accomplish this safety factor. The proper disposal of pesticides will also help to eliminate pollution in the environment.

STUDY ASSIGNMENT

AFM 91-16, Chapter 6

QUESTIONS

1. Describe the prime methods of pesticide disposal.
2. List the steps in destroying empty pesticide containers.

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SG 3ABR56630-I-9
July 1975

CHEMICAL LABORATORY AND STORAGE FACILITY MAINTENANCE

Day 5

OBJECTIVE

Upon completion of this study guide, you will be able to list the requirements for the care and maintenance of chemical laboratory and storage facilities.

INTRODUCTION

In order to obtain a safe, effective pest control operation, it is necessary to provide safe storage facilities for pesticides. Maximum efficiency can be obtained from a properly maintained chemical laboratory and storage facility.

STUDY ASSIGNMENT

1. AFM 91-16, Chapter 6
2. CDC: Insecticides for the Control of Insects of Public Health Importance, pages 54 and 55.

QUESTIONS

1. List the requirements for safe storage of pesticides on vehicles.
2. List the requirements for containers within the storage area.
3. Why are inventories of chemicals essential?

SG 3ABR56630-I-10
July 1975

HAND-POWERED DISPERSAL EQUIPMENT

Day 6

OBJECTIVE

When you have completed the assignment in this study guide, you will be to identify hand-operated dispersal equipment, and list the preoperational inspection procedures for selected hand-operated equipment.

INTRODUCTION

The use of hand-operated dispersal equipment is vital to the military pest controller. This equipment is used in the majority of operations and is useful in a variety of circumstances. A command of this equipment will enable the engineering entomologist to effectively carry out a pest control program.

STUDY ASSIGNMENT

1. AFM 91-16, Chapter 4, Section 1
2. CDC: Insecticide Application Equipment for the Control of Insects of Public Health Importance, pages 1-18, 37-44.

QUESTIONS

1. What is the optimum operating pressure of a compressed air sprayer?
2. What is the capacity of the rotary hand duster?
3. What is the rate of application of an aerosol spray bomb?

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SG 3ABR56630-I-11
July 1975

POWER DRIVEN DISPERSAL EQUIPMENT

Days 7, 8, 9, 10

OBJECTIVE

When you have completed the assignment in this study guide, you will be able to identify and list the inspection and operating procedures for power-driven dispersal equipment.

INTRODUCTION

The work of the engineering entomologist can be made much easier by the use of power-driven equipment. Proper maintenance and use of this equipment can enable you to reduce man-hours of tedious labor and increase the effectiveness of the operation.

STUDY ASSIGNMENT

1. Armed Forces Pest Control Board TIM Number 13, "Ultra Low Volume Dispersal of Insecticides by Ground Equipment"
2. AFM 91-16, Chapter 4, Section 1
3. CDC: Insecticide Application Equipment for the Control of Insects of Public Health Importance, pages 19-44.

QUESTIONS

1. What type agitation is used by the piston pump sprayer?
2. The effective swath width of the mechanical aerosol generator is from 50 to ______ feet.
3. In the ULV method of insecticide application, the majority of spray droplets must vary between _________ and _________ microns in diameter.
4. A TEEJET nozzle bearing the Tip number 8002 will disperse _________ GPM at 40 PSI.

SELECTION OF PROPER PEST CONTROL TECHNIQUES

Day 10

OBJECTIVE

Upon completion of this study guide, you will be able to identify the various types of pest control methods used for controlling insect and rodent pests. You will also be able to choose the proper pest control method to fit the situation at hand.

INTRODUCTION

The selection of the proper pest control method to satisfy a given control situation is essential to the efficiency of the mission. Both man-hours and cost of a control program can be kept to a minimum if the proper control method is chosen at the earliest possible time. It is essential that you have knowledge of all the control measures that are at your dispersal.

STUDY ASSIGNMENTS

AFM 91-16, Chapter 2, Section 2, and Chapter 4

QUESTIONS

1. List the types of nonchemical permanent pest control.
2. Why is chemical control only temporary?
3. What hazards are involved in aerial dispersal?
4. List the justifications needed for aerial dispersal.

WORKBOOKS 3ABR56630-I-1-P1 thru I-12-P1

Department of Civil Engineering Training

Entomology Specialist

ENTOMOLOGY FUNDAMENTALS, PESTICIDES, AND EQUIPMENT

17 September 1973

SHEPPARD AIR FORCE BASE

Designed For ATC Course Use

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BASIC PRINCIPLES OF PEST CONTROL

OBJECTIVE

Upon completion of this workbook, you will be able to describe the basic principles of pest control.

QUESTIONS

1. Differentiate between prevention and eradication ______________________

2. Differentiate between natural and applied pest control. ______________________

3. Explain the function of sanitation in pest control. ______________________

4. List the types of applied pest control.

   a. ______________________
   b. ______________________
   c. ______________________
   d. ______________________
   e. ______________________
   f. ______________________

5. Describe the essential steps necessary in planning a sound pest control program.

SANITATION IN THE CONTROL OF PESTS

OBJECTIVE

Upon completion of this workbook, you will be able to identify the sanitation requirements for insect and rodent control.

QUESTIONS

1. Define and explain the following terms:

   a. Sanitation: ______________________________

   ____

   b. Life essentials for insects and rodents:

   (1) ______________________________

   (2) ______________________________

   (3) ______________________________

   c. Sanitary landfill: ______________________________

   ____

2. Answer the following questions on sanitary landfill and refuse collection:

   a. The three phases of refuse collection are:

   (1) ______________________________

   (2) ______________________________

   (3) ______________________________

   b. The most satisfactory methods of refuse disposal are:

   (1) ______________________________

   (2) ______________________________

   c. The basic requirements of a sanitary landfill are:

   (1) ______________________________

   (2) ______________________________

   (3) ______________________________

   (4) ______________________________

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d. The two most vital elements in obtaining public cooperation in sanitation programs are:

____

____

e. The most important element in the control of flies and rodents:

____

f. The Air Force manual on insect and rodent control is ________________

____

g. Air Force manuals are all indexed in AFR ________________

h. List five advantages and benefits of incineration.

____

____

____

____

____

i. List five disadvantages of sanitary landfills:

____

____

____

____

____

3. Explain how a well organized and properly operated sanitation program will reduce population of rats, stored product pests, and flies.

____

____

____

____

____

FIELD ECOLOGY

OBJECTIVE

Upon completion of this workbook, you will be able to identify the problems of the Air Force pest controller in an ecological situation.

QUESTIONS

1. List the various consumers found in an ecological situation.

2. Describe the variables that exist in an environment.

3. What is man's role in the biosphere?

4. How can pesticides damage ecosystems?

5. Resistance to an insecticide may be defined as ____________________

6. List the types of resistance.

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7. How can resistance be controlled?

8. Describe the methods used in determining pesticide toxicity.

9. Describe the effects of pesticides on human health.

10. State the methods of reducing environmental damage and health hazards of pesticides.

EPIDEMIOLOGY OF VECTOR-BORNE DISEASES

OBJECTIVE

Upon completion of this workbook, you will be able to describe the relationship between arthropods and disease.

QUESTIONS

1. According to the World Health Organization, what is the most important vector-borne disease?

   ____

2. How many species of arthropods have been described and how many are associated with human disease? ______________________________

   ____

3. Define the following terms:

   a. Pathogenic agent ______________________________

   b. Disease ______________________________

   c. Host ______________________________

   d. Parasite ______________________________

   ____

   e. Resistance ______________________________

   ____

   f. Epidemiology ______________________________

   g. Reservoir ______________________________

4. List the effects of arthropods on human health. ______________________________

   ____

   ____

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5. List the methods of vectoring. ____________________

____

____

6. List the methods of disease transmission by insects. ____________________

____

____

7. Describe the types of parasites. ____________________

____

8. List the five major factors that are required by an arthropod in order to transmit a disease.

____

____

____

____

____

9. What are the ways in which epidemics are classified? ____________________

____

____

____

10. List the difficulty in controlling the arthropod population. ____________________

____

____

____

____

PESTICIDE CLASSIFICATION AND CHARACTERISTICS

OBJECTIVE

Upon completion of this workbook, you will be able to classify pesticides according to their characteristics and to also determine their toxicity.

QUESTIONS

1. List the three general methods of classifying pesticides.

____

____

____

2. Place the following pesticides in their respective classes or groups based on their origin of chemical structure. Also list the mode or modes of entry for each pesticide.

	NAME	GROUP	MODE OF ENTRY
Example:	DDT	Chlorinated Hydrocarbon	Stomach and Contact
a.	Malathion	______	______
b.	Chlordane	______	______
c.	Diazinon	______	______
d.	Dieldrin	______	______
e.	Rotenone	______	______
f.	Lindane	______	______
g.	Pyrethrum	______	______
h.	PDB	______	______
i.	Nicotine	______	______
j.	Sevin	______	______
k.	Paris green	______	______

3. What are the three modes of entry of pesticides?

4. Define toxicity:

5. Define LD_{50}:

6. List the toxicity ranges and relative values of each.

7. List the human health hazards for each of the following groups of pesticides.

Organic phosphates

Chlorinated hydrocarbons

Carbamates

PESTICIDE SAFETY

OBJECTIVE

Upon completion of this workbook, you will be able to list and explain the first aid procedures for insecticidal poisoning and also various pieces of safety equipment at your disposal.

QUESTIONS

1. List the characteristics of pesticides that the entomologist should know.

2. What are the responsibilities for protecting people and property?

3. List the precautions to be used when transporting pesticidal chemicals.

4. List in correct sequence the steps to be taken for insecticidal poisoning by ingestion.

5. What organization would you contact to obtain special information on insecticidal poisoning?

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6. List the correct sequence of steps to be taken in the event of fumigation poisoning.

7. What is the most important action to take when applying first aid?

8. List three of the most commonly used antidotes.

9. Explain the importance of the following pieces of safety equipment:

a. Gloves

b. Goggles

c. Apron

d. Coveralls

e. Respirator

f. Face shield

g. Ear guards

10. List the basic precautions to be observed during pesticide dispersal in the field.

SAFE DISPOSAL OF PESTICIDES

OBJECTIVE

Upon completion of this lesson, you will be able to list the accepted methods of pesticide disposal and use them properly.

QUESTIONS

1. List the general methods of pesticide disposal.

2. List the methods of pesticide and pesticide container disposal available to:

Householders and small farm operators

Commercial pest controllers

Industrial users and manufacturers

3. What precautions should be taken for ground disposal?

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CHEMICAL LABORATORY AND STORAGE FACILITY MAINTENANCE

OBJECTIVE

Upon completion of this workbook, you will be able to list the requirements for the maintenance of chemical laboratory and storage facilities.

QUESTIONS

1. Describe the proper physical conditions suitable for chemical laboratory and storage areas. ______________________________

2. List the proper storage procedures for pesticides. ______________________________

3. Explain the precautions to be taken when transferring pesticides from one container to another. ______________________________

4. What is the most important part of a pesticide container? ______________________________

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HAND-POWERED DISPERSAL EQUIPMENT

OBJECTIVE

Upon completion of this workbook, you will be able to identify and properly use the various pieces of hand-operated dispersal equipment available to the pest controller.

QUESTIONS

1. Describe the use of each of the following:

   a. Compressed air sprayer ____________________

   ____

   b. Rotary duster ____________________

   ____

   c. Foot pump duster ____________________

   ____

   d. Bulb duster ____________________

   ____

   e. Siphon atomizer ____________________

   ____

   f. Pistol sprayer ____________________

   ____

   g. Aerosol bomb ____________________

   ____

2. List the main points of inspection for a preoperational inspection on most pieces of dispersal equipment. ____________________

   ____

   ____

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3. **The average pressure that should be maintained in a compressed air sprayer is ____________________.**

4. **The sprayer most frequently used in insect control work is ____________________.**

5. **What item of hand-powered dispersal equipment may be used to apply residual dusts to an outdoor area? ____________________**

6. **Given a piece of hand-powered dispersal equipment, outline the steps for the preoperational check on this piece of equipment.**

7. **Describe the clean-up procedures for this piece of equipment after use.**

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POWER-DRIVEN DISPERSAL EQUIPMENT

OBJECTIVE

Upon completion of this workbook, you will be able to perform preoperational inspections of power driven dispersal equipment; calibrate and operate the equipment to apply control measures to specific areas; and maintain required records of the treated area.

QUESTIONS

1. List the major uses of the following pieces of power equipment.

   a. Dyna fog 150B ____________________

   b. Buffalo turbine ____________________

   c. Hydraulic sprayers ____________________

   d. Mechanical aerosol generator ____________________

   e. Back-pack mister-duster ____________________

   f. Challenger mister ____________________

2. List the main points of inspection for the above pieces of power equipment.

____

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OPERATING THE CHALLENGER AEROSOL MIST GENERATOR

1. Prepare the formulation to treat an area designated by the instructor.

2. Perform a preoperational inspection of the aerosol mist generator.

3. Follow the procedures listed below and operate the aerosol generator to treat an area prescribed by the instructor.

   a. Turn liquid valve off.

   b. Pour insecticide into container.

   c. Plug into electrical outlet.

   d. Start motor (toggle switch).

   e. Open liquid control valve to setting required.

   NOTE: You get finest particle size and the unit operates most efficiently on low output. Effective coverage is possible with 1/2 to 1 ounce of insecticide per 1000 cubic feet.

   f. Never direct fog at close objects.

   g. For roaches, silverfish, or other crawling insects, direct the fog low.

   h. For flies, mosquitoes, and other flying insects, direct the fog upward and toward far corners of the room.

   i. After treating the specified area for the prescribed period of time, stop the aerosol generator by:

      (1) Turning off the liquid valve.

      (2) Permit the unit to run for several minutes after turning off the liquid valve. This action will clean out the equipment and also circulate the air in the room.

      (3) Stop motor (toggle switch).

4. Clean and store the Challenger aerosol generator using the proper cleaning and storage methods.

OPERATING THE "MITY MITE" BACK-PACK MISTER-DUSTER

1. Prepare the insecticidal formulation.

2. Perform a preoperational inspection of back-pack sprayer-duster.

3. Prepare the back-pack for operation.

   a. Mix 3/4 pint SAE 30 oil to 1 gallon of gasoline.

   b. Mix gas thoroughly with oil in a safety container. Never mix in the tank of unit.

   c. Fill the gas tank on the unit with gas and oil mixture being careful not to spill any on the unit or surrounding area.

   d. Fill the hopper unit with dust or liquid solution depending on the type of application to be made.

4. Procedures for starting back-pack.

   a. Put switch in ON position.

   b. Close choke fully and open throttle.

   c. Crank engine with a quick short pull on the starting rope.

   d. When engine fires move choke to half-way position and as engine warms up, adjust choke to no choke position.

5. Procedures for operating back-pack for dust dispersal.

   a. When dust is used the petcock to the plastic liquid line should be closed by turning counterclockwise.

   b. Open the dust calibration lever by removing the pin and push the lever down. Open the lever to half-open position and insert pin so lever cannot close. Step off an area 150 feet long. The swath width is 50 feet.

   c. With engine running smoothly and throttle wide open, walk the 150 feet in approximately one minute. If the recommended dosage is 30 lbs per acre and the 150 x 50 area is 7,500 sq ft or about 1/6 of an acre, you should have dispersed 5 lbs of dust.

   d. If you have dispersed less than 5 lbs of dust, open the dust control lever by moving it down two or three notches and repeat above procedure.

   e. If you dispersed more than 5 lbs of dust, close the dust control valve by raising up on the lever and repeat above procedure until you have the desired output.

f. There is no mechanical agitator on the hopper. Agitation is done by bleeding air from the turbine outlet into the hopper. To maintain proper agitation and dust flow, always be sure the cap on the hopper is tight.

g. After treating a specified area and you are ready to stop the engine, place the switch in the OFF position.

h. After using dust in the hopper always be sure that the hopper and the control valve are thoroughly flushed with water before using the machine as a mist blower. This thorough cleaning should be done every time the machine is used to prevent clogging and contamination.

6. Procedures for operating back-pack for liquid dispersal

a. When using the back-pack as a mist blower (liquid spray) close the hopper dust control valve by lifting up on the lever. Apply a firm pressure on the lever and raise it as far as it will go. Insert the pin in the hole to hold the valve in the OFF position.

b. Open the liquid outlet petcock by turning it in a clockwise direction until it is fully open.

c. Control the flow of liquid with the valve at the nozzle.

d. Step off an area 150 feet long. The swath width of the backpack is approximately 50 feet.

e. With the engine running smoothly and the throttle wide open, walk the 150 feet in approximately one minute; with the liquid valve at the nozzle 1/2 open.

f. If the recommended dosage is 2.5 gal per acre and the 150 x 50 area is 7,500 sq ft, or about 1/6 of an acre, you should have dispersed .5 of a gallon of liquid.

g. If you have dispersed less than 1/2 gallon of liquid, open the liquid control valve to approximately 3/4 open and repeat above procedure until you have the desired output.

h. If you dispersed more than 1/2 gallon, close the liquid control valve to approximately 1/4 open position. Repeat above procedure until you have the desired output.

i. Once the liquid valve is adjusted to give you the desired output, you should not have to readjust it. The valve is spring-loaded and will remain in position until you readjust it.

j. After treating a specified area and you are ready to stop the engine, place the switch in the OFF position.

k. Thoroughly clean the hamper and liquid line by washing with a good detergent and water.

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l. After you have cleaned the tank, let the unit run a few minutes, with the petcock and liquid valve at nozzle open and the cap to the tank on tight.

This will dry the tank and discharge line with the air blast from the turbine.

m. Wipe out any moisture that is left with a cloth and wipe down and thoroughly clean the outside of the unit.

7. Prepare for storage

a. If the unit is not going to be used in a period of one month or longer, drain the fuel tank before storage.

b. Drain the fuel tank by disconnecting the fuel line at the carburetor.

c. Start the engine and run it until the fuel in the carburetor is exhausted.

QUESTIONS

1. At what setting should you set the liquid control valve on the Challenger electric mister? ______________________________

2. List the major use of the Challenger electric mister. ______________________________

____

3. What types of formulations can be dispersed with the back-pack mister-duster?

____

4. Describe the starting procedures for the back-pack mister-duster.

____

____

____

____

____

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OPERATING THE DYNA FOG 150B, OR PULSE JET AEROSOL GENERATOR

1. Perform the following tasks with the pulse-jet aerosol generator. Select the proper items of safe clothing and equipment.

   a. Prepare the insecticidal formulation.

   b. Perform a preoperational inspection of the pulse-jet aerosol generator.

   c. Safety precautions

      (1) Avoid pouring gasoline into the insecticide tank. This does not result in immediate fire, but any closed area can be overfilled with an invisible combustible vapor resulting in a fire or explosion.

      (2) For minimum safety the base oil of any prepared insecticide must be a high flash point oil.

      (3) Avoid spilling fuel or insecticide over the machine and adjacent area when filling tanks. This can be a source of fire, so promptly wipe up such spilled liquids.

      (4) Prior to fogging interior areas, extinguish all open flames and cut off all electrical power to eliminate all potential sources of ignition of the fog.

      (5) Do not fog more than 1 gallon per 50,000 cubic feet of space in closed areas.

      (6) Do not block the insecticide control lever in the open position and leave the machine unattended. If the engine stops and insecticide continues flowing, it will ignite and could set fire to any combustible material below discharge end of machine.

   d. Prepare the pulse jet generator for operation:

      (1) Fill the fuel tank with regular grade gasoline. Premium grades of gasoline will not improve performance, but may reduce performance by leaving deposits in the small fuel metering orifice.

      (2) Use clean gasoline; dirty fuel can quickly overload the fuel filter. Water in the fuel can cause unexplained stops. Very old, stale gasoline can have detrimental effect on the rubber seals in the fuel system.

      (3) Make sure the fuel cap is on securely as the fuel system must be pressure tight for machine to start and operate properly.

      (4) Fill the insecticide tank with an insecticide formulation prepared especially for thermal fogging and for the specific job to be accomplished.

      (5) Make sure the insecticide cap is on securely, for the tank is pressurized from the heat of the exhaust flames from the engine and the tank has to be pressure tight to fog properly.

e. Procedures for starting the pulse-jet generator.

(1) Open fuel valve, hold ignition switch on continuously and operate starting air pump. When the engine begins firing, stop pumping, but hold ignition switch on until engine runs smoothly. To clear a flooded engine, repeat starting procedure with a closed fuel valve. When excess fuel burns out, repeat normal start.

(2) Actuating the starting air pump forces air into the fuel tank simultaneously blows air into the engine intake. No specific pumping technique is required, but a full stroke will result in a faster start, while an extremely slow stroke may fail to pressurize the tank and the engine will not start.

(3) The ignition switch must be held on continuously while starting, otherwise, the air-fuel mixture around the spark plug will immediately become too rich to fire and the engine is flooded.

f. Procedures for fogging with the pulse-jet generator.

(1) After the engine is running smoothly, lift the fog generator and place the carrying strap over the shoulder. Keep the pulse-jet generator in front of you so you can readily get to the insecticide on-off lever, the insecticide metering valve and also have control over the machine and direct it toward the area to be fogged.

(2) To fog an area, lift up on the insecticide on-off-lever. Adjust the insecticide metering valve to the desired fog rate by turning the knob counterclockwise. The knob is calibrated from 1 to 10 and you will disperse approximately 1 1/2 gallon/hour for each number. Example, on pos 2, you would disperse approximately 3 gal/hr, on pos 4, 6 gal/hr, etc. For best results, fog on a low setting. This way, you get a finer particle size and a dryer fog.

(3) When the fogging operation is complete, stop fogging by releasing the on-off lever. Then close the insecticide metering valve. Stop the engine by closing the fuel valve.

(4) Release the pressure in the insecticide tank by unscrewing the insecticide tank cap. Unscrew the cap slowly as the tank is pressurized and by suddenly releasing the pressure, the insecticide will splash out, getting on you and the machine. This procedure provides double insurance against the accidental passage of formulation into the tail pipe of an engine not in operation.

NOTE: Do not place the machine on its side when fuel and insecticide tanks are full. This will permit fuel and insecticide to enter small holes in tank neck, getting into thelines and causing the engine to become flooded when normal starting is tried.

2. QUESTIONS

a. What type formulation can be dispersed with the Dyna Fog 150B? ________________________

b. What is the rate of output for the Dyna Fog 150B? ________________________

c. Explain the difference between a wet fog and a dry fog. ________________________

Under what conditions would each be used? ________________________

d. Why must the fuel and insecticide caps be secured tightly? ________________________

e. Why does the insecticide line coil around the barrel of the Dyna Fog 150B? ________________________

OPERATING THE MECHANICAL AEROSOL GENERATOR OR THE COLD FIGGER

1. Perform the following tasks with the mechanical aerosol generator (cold fog generator).

   a. Select the proper items of safety clothing and equipment.

   b. Select the proper chemicals and prepare the insecticidal formulation to treat a given area.

   c. Perform a preoperational inspection of the mechanical fog generator.

   d. First Aid

      (1) If any person not wearing gas masks or protective clothing should suffer prolonged exposure to decontaminate vapor, remove the persons affected to fresh air and summon a physician.

      (2) If liquid contaminate should contact the hands or any part of the body, wash the skin immediately with large quantities of water. Soak splashed garments in water.

      (3) Immediately remove wet clothing and shoes and wash skin area under clothing through which liquid may have penetrated.

      (4) If formula liquid or fog should come in contact with the eyes, flush immediately with water. Continue flushing for at least 15 minutes and summon a physician.

      (5) If decontaminate formula should be taken internally, summon a physician immediately. To counteract the effects of betapropiolactane, wash the mouth immediately with water, then drink several glasses of water to induce vomiting. To counteract formaldehyde, drink large quantities of milk and raw egg white to induce vomiting. Then drink a solution of one part aromatic spirits of ammonia in 10 parts of water, followed by milk within a few minutes. Induce vomiting again.

   e. Safety Precautions

      (1) Exercise extreme caution to avoid getting any liquid decontaminate or insecticide on the skin, clothing, or shoes when servicing or performing any maintenance on the sprayer. Coveralls or laboratory clothing with long sleeves, a rubber apron, rubber shoes or boots, rubber gloves, and a gas mask or protective face shield plus an approved type of goggles for handling corrosive materials should be worn when handling liquid decontaminating and insecticidal agents.

      (2) Exercise extreme caution when filling the fuel tank. Do not fuel or formula tank while the engine is running. Gasoline and formula spilled on a hot engine is a fire hazard.

(3) When filling the fuel tank, provide a metal-to-metal contact to prevent sparking caused by static electricity.

(4) Avoid smoking or open flame in area when handling gasoline or insecticide/germicide formula.

(5) Do not operate the sprayer in an enclosed area unless the engine exhaust is vented to the outside. Exhaust gases contain carbon monoxide, which is an odorless, colorless, and poisonous gas.

(6) Do not operate the sprayer near an open flame. An explosion or fire may result causing injury or death to personnel.

(7) The operator should avoid inhaling insecticide or allowing clothing to become saturated. Insecticides are harmful to the lungs and skin.

(8) Avoid prolonged or repeated breathing of decontaminate vapor. Standard decontaminating agents are betapropiolactane and formaldehyde, which are poisonous and extremely harmful to the eyes, skin, and lungs.

(9) Do not spray in an enclosed area without protective clothing and mask.

(10) Avoid exposure to wind blown aerosol fog. while operating the sprayer outside.

(11) Do not spray parked cars or laundry on the line.

(12) Take a shower and change to fresh clothing immediately after exposure to vapor.

(13) Soak clothing that has been wet by formula in water. Do not send the soiled garments to the laundry before soaking as the laundry worker may blister his hands. Do not rewear the garments until at least 24 hours after they have been washed.

(14) Thoroughly flush with water all equipment used with insecticide or germicide. Do not handle internal pump parts, lines, fittings, valves, strainers, and nozzles without protection until the sprayer has been thoroughly flushed with water.

(15) Do not enter a building in which betapropiolactane has been used until the building has been ventilated for 2 or 3 hours. Formaldehyde fumes are more persistent and may require 2 or 3 days of ventilation and 2 or 3 wash-downs of the floor to eliminate danger to personnel.

2. Procedures for starting the mechanical fog generator.

a. Open the curtains and remove the panels.

b. Unfasten the strap holding the suction and bypass hoses and place the ends of the hoses in a container of water or insecticide.

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CAUTION: Do not operate unless hoses are submerged in liquid. Running the fluid pump dry results in damage to the pump gears.

c. Close the air pressure valve (1).

d. Turn the three-way valve to bypass position (2).

e. Open the flow control valve counterclockwise 1 or 2 turns (3).

f. Close the fluid pump drain cock (4).

g. Open the fuel shutoff valve (5).

h. Prime the carburetor (6).

i. Pull out chock control.

j. Lock governor control 1/3 out.

k. Pull out the ignition and depress starter switch.

l. Adjust choke for smooth operation.

m. Lock governor in idle position.

3. Procedures for fogging with the mechanical fog generator:

a. Loosen the toggle screws and adjust the elbows and spray manifold for desired spray angle, then tighten toggle screws.

b. Open air pressure valve.

c. Turn governor control counterclockwise to unlock and pull governor control out until a reading of 5.2 inches of mercury is obtained on the manometer. Turn the governor control clockwise to lock into position.

d. Adjust the flow control valve to obtain a reading of 0.6 GPM on the flow gage.

e. Turn the three-way valve to NOZZLE position.

NOTE: Upon opening the three-way valve to nozzle position, insecticide is subjected to the airblast from the blower and forced through the nozzles which shear the insecticide into tiny particles. The combination of this shearing action and the airblast produces the fog.

f. Observe the insecticide pressure gage. Normal operating pressure is 20 psi.

NOTE: The mechanical fog generator has an effective swath width from 50 to 200 feet, depending upon weather conditions.

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4. Procedures for stopping the mechanical fog generator.

   a. Turn three-way valve to bypass position.

   b. Adjust the governor control to idle and operate the engine two or three minutes to cool the engine.

   c. To stop the engine, push the ignition switch in.

   d. After the engine has stopped, close the air valve and flow control valve.

   e. Close the fuel shutoff valve.

   f. Open the fluid pump drain cock.

QUESTIONS

1. What items of safety equipment should be worn when operating the Mechanical Aerosol Generator? ______________________________

____

____

2. What type of agitation does the cold fogger have? ____________________

____

3. How are the insecticidal particles broken down on this piece of equipment?

____

____

4. What is the proper rate of flow in gallons per minute for the cold fogger? ______

____

5. What is the effective swath width? ______________________

____

6. What formulations can and cannot be used with this piece of equipment? ______

____

____

OPERATING THE VEHICLE MOUNTED HYDRAULIC SPRAYER (ALSO SKID MOUNTED HYDRAULIC SPRAYER)

1. **Perform the following tasks with the vehicle mounted hydraulic sprayer.**

   a. **Select the items of safety clothing and equipment required for mixing and dispersal of the chemicals to treat an area specified by your instructor.**

   b. **Prepare the insecticidal formulation to treat for the specific type of pest and the area designated by your instructor.**

   c. **Perform a preoperational inspection on the vehicle mounted hydraulic sprayer.**

   d. **Safety precautions:**

      (1) **Never fill the fuel tank when the engine is in operation or is not. This could result in a fire or explosion.**

      (2) **Never operate the engine in an enclosed area unless the exhaust fumes are piped outside. The exhaust fumes contain carbon monoxide, poisonous, odorless, and invisible gas, which, if breathed into the lungs, could cause serious illness or even death.**

      (3) **Never disperse any type of chemicals without the necessary items of safety clothing and equipment.**

2. Procedures for starting the hydraulic sprayer

   a. Check the air-dome (pulsation dampener) and make sure it is pressurized with air.

      NOTE: To operate the pump with a discharge pressure of 30 to 60 PSI, pressurize the pulsation dampener to 25 PSI; from 60 to 125 PSI discharge pressure, pressurize the dampener to 50 PSI; from 125 to 400 PSI discharge pressure, pressurize the dampener to 100 PSI.

   b. Check the spray nozzle on the end of the discharge hose to make sure it is off.

   c. Open the pump inlet valve located at the bottom right of the pump.

   d. Open the pressure regulating valve by loosening the lock nut and decreasing the spring tension by turning the regulator all the way open.

   e. Open the choke.

   f. Wind the starting rope around the pulley at the front of the engine and start with a quick pull of the rope.

   g. When engine starts, push choke in gradually as engine warms up.

      NOTE: Allow engine to warm up to operating temperature before a load is applied.

3. Procedures for chemical application:

   a. Fill the tank with the required amount of water or oil, depending on the type of application to be made.

   b. Add the correct type and amount of chemical to the carrying agent to obtain the desired percentage of the formulation.

   c. Check to make sure the pump inlet valve is open.

   d. Check to make sure the pressure regulating valve is fully open.

   e. Check the spray-jet nozzle at end of discharge hose to make sure it is in OFF position.

   f. Start the engine and allow it to run long enough to thoroughly mix the chemical and carrying agent.

   g. For small area application and for trees and shrubbery application, open spray-jet nozzle to obtain the desired spray pattern and lock into position.

   h. Spray area on trees or shrubbery ascertaining that you get a thorough and even coverage.

   i. For large area applications using the boom or the wide-angle spray nozzle:

      (1) Fill the tank with 20 gallons of water.

      (2) Make a trial run over an area to determine the effective swath width and at the same time, determine how much time was required to disperse the 20 gallons of water.

      (3) Now that you know the swath width and output in gallons per minute, determine the speed required to cover an area designated by your instructor.

      (4) Fill the insecticide tank with the required amount of carrying agent.

      (5) Add the correct amount of chemical to obtain the specified percentage of the formulation.

      (6) Operate the hydraulic sprayer to treat the area designated by your instructor.

      (7) After the application is complete, clean the insecticide tank by hosing it while the unit is running. Run several gallons of water through the pump, lines, and nozzles.

      (8) Leave the outlet nozzle on the discharge line open. This will relieve the pressure on the hose when you stop the unit.

      (9) Open pressure regulator valve wide open.

(10) Stop the engine by depressing the magneto ground switch located directly below the muffler.

(11) Close the pump inlet valve, the pressure regulating valve and nozzle at discharge end of hose.

(12) Clean the outside of the unit by hosing and wiping dry, being careful not to get any water on the engine.

QUESTIONS

1. What type agitation do both the skid-mounted and vehicle-mounted hydraulic sprayers have? ______________________

2. What is the purpose of the pulsation dampener or air dome? ______________________

3. What type pumps can be found on the hydraulic sprayers? ______________________

4. Explain the uses for the skid-mounted hydraulic sprayer. ______________________

5. Explain the uses for the vehicle-mounted hydraulic sprayer. ______________________

6. What cleaning procedures should be taken after each use? ______________________

OPERATING THE VEHICLE MOUNTED MIST-DUST BLOWER (BUFFALO TURBINE)

1. Perform the following tasks with the vehicle mounted mist-dust blower (Buffalo (Turbine).

   a. Select the proper items of safety clothing and equipment.

   b. Select the chemicals and prepare the insecticidal formulation to treat an area specified by your instructor.

   c. Perform a preoperational inspection on the Buffalo turbine.

   d. Safety precautions:

      (1) Never fill the fuel tank when the engine is in operation or is hot. This could result in a fire or explosion.

      (2) Never operate the engine in an enclosed area unless the exhaust fumes are piped outside. The exhaust fumes contain carbon monoxide, a poisonous, odorless, and invisible gas, which, if breathed into the lungs, could cause serious illness or even death.

      (3) Never make adjustments on the turbine unit while the engine is running or without removing the ignition cables from the spark plugs if the engine is not running.

      (4) Never disperse any type of chemical without proper items of safety clothing and equipment.

2. Procedures for starting the Buffalo turbine:

   a. Check the clutch to the dust bin and make sure it is disengaged.

   b. Check the liquid spray valve and make sure it is closed.

   c. Open the fuel shutoff valve.

   d. Close the choke by pulling out the choke button.

   e. Turn on the ignition by pulling out on the switch button.

   f. Turn the throttle counterclockwise and pull out about 1/3 open and lock in position by turning clockwise.

   g. Depress starter switch.

   h. When engine starts, push choke in gradually, as engine warms up.

   NOTE: Allow engine to warm up to operating temperature before the load is applied.

3. Procedures for applying dust with the Buffalo turbine:

a. Fill liquid tank with water and be sure liquid line valve from tank to pump is open.

CAUTION: Never operate or start machine when the pump is dry.

b. Open the dust gates in the dust bin to the halfway point by means of the dust control lever found at the bottom front part of the dust bin.

c. Put 10 lbs of dust in the dust bin.

d. Open throttle full and lock in fully open position by turning the knob clockwise.

e. Engage the dust bin clutch.

f. Time how long it takes to feed the 10 lbs of material out of the bin. From this timing, it can be determined how much material is being used per minute.

g. If too much dust is being dispersed per minute, decrease the amount by moving the control lever to the right.

h. If less than the desired amount of dust is being dispersed per minute, increase the amount by moving the control lever to the left.

NOTE: Flow rates will vary with different materials. Once the dust gate is regulated for a specific material, it is not necessary to move the control lever; the control will then be controlled by engaging or disengaging the dust bin clutch.

CAUTION: Never engage the dust bin clutch when the dust gates are in the closed position.

NOTE: If it is best to fill the dust bin after reaching the application area as jarring from traveling will pack some dust amazingly solid.

i. Should the dust become packed solid, fluff up the dust as much as possible and open the control gates wide open.

j. Engage the clutch and allow the agitators to make a few revolutions. This should loosen the dust to where the control gates can be closed to the desired position and the application can begin.

k. To keep the dust from drifting or to make it stick to the foliage, open the liquid control valve and disperse water from the sprayer at the same time the dust is being dispersed.

l. Make a trial run over the area to be treated and determine the effective swath width.

m. Now that you know the output in lbs per minute and the swath width, determine the speed of the tow vehicle to disperse the required amount of insecticide for the area specified by your instructor.

n. Operate the Buffalo turbine to treat the specified area.

o. After the dust application is complete, clean the inside of the dust bin by hosing it thoroughly.

NOTE: Let the unit run for several minutes after hosing the bin. The airblast from the turbine will dry out the air nozzle.

4. Procedures for liquid application with the Buffalo turbine:

a. Make sure that the dust bin clutch is in the disengaged position.

b. Check to make sure the liquid line control valve is closed.

c. Check the pump inlet valve in line between tank and pump and make sure it is open.

d. Fill liquid tank with 20 gallons of water.

e. Open throttle full and lock in fully open position by turning clockwise.

f. Open the liquid line control valve and time how long it takes to disperse the 20 gallons of water. From this timing, you will be able to determine the speed of the tow vehicle to effectively cover a given area applying the proper amount of chemical.

NOTE: The size of the liquid nozzles and the pressure determine the output per/min. The pressure can be varied from 5 to 80 PSI by increasing or decreasing the spring tension on the pressure regulating valve.

CAUTION: Never operate the model 77 pump on pressure exceeding 80 PSI. This will force the diaphragm out of place or out of shape and render the pump useless.

g. Fill the tank with the required amount of water or oil depending upon type of application to be made.

h. Add the proper type and amount of chemical to the carrying agent to obtain the correct percentage of the formulation.

i. Open the throttle wide open and then open the liquid control valve.

j. Make a trial run over the area to be treated to determine the effective swath width.

k. Now that you know the output in GPM and the swath width, determine the speed of the two vehicles to cover an area specified by your instructor.

l. Operate the Buffalo turbine to treat the area designated by your instructor.

m. After the application is complete, clean the liquid tank by hosing it while the unit is running. Run several gallons of water through the lines and nozzles.

n. Leave the liquid-line control valve open until after the engine is stopped.

o. Reduce engine speed to idle and let the engine run for 2 or 3 minutes at this speed.

p. Stop engine by pushing in the ignition.

q. Thoroughly clean the outside of the unit by hosing and wiping dry.

r. Close liquid line control valve.

QUESTIONS

1. What types of formulations can be dispersed with the Buffalo Turbine?

2. What would be the reason for dispersing liquid and dusts at the same time? ____

3. What is the capacity of the liquid tank? ____

   Of the dust hopper? ____

4. What is the effective swath width of the Buffalo Turbine for both liquids and dusts? ____

5. Why must there at all times be liquid of some kind (water at least) in the liquid tank? ____

SELECTION OF PROPER PEST CONTROL TECHNIQUES

OBJECTIVE

Upon completion of this workbook, you will be able to select the proper pest control method for any given control situation. The best control method is also the most efficient.

QUESTIONS

1. Why should the control method be selected as early as possible?

2. What are the controlling factors in determining whether the control method should be permanent or temporary?

3. Describe the advantages of nonchemical permanent controls.

4. List the types of permanent control.

5. Is chemical control permanent or temporary? Why?

6. Describe the special control problems you may have to deal with.

7. Describe the justifications necessary for aerial dispersal.

8. What is the "BEST" method of control for population of pests both insect and rodent?

LESSON PLAN (Part I, General)

APPROVAL OFFICE AND DATE TCETC 9 JUN [illegible]	INSTRUCTOR
COURSE NUMBER 3ABR56630	COURSE TITLE Entomology Specialist
BLOCK NUMBER II	BLOCK TITLE Control of Medically Important Pests

LESSON TITLE
Pesticide Formulation Calculations (Days 11, 12, & 13)

LESSON DURATION

CLASSROOM /Laboratory	Complementary	TOTAL
18 Hrs	6 Hrs	24 Hrs

POI REFERENCE

PAGE NUMBER	PAGE DATE	PARAGRAPH
16	15 May 1975	1

STS/CTS REFERENCE

NUMBER	DATE
STS566XO	7 November 1974

SUPERVISOR APPROVAL

SIGNATURE	DATE	SIGNATURE	DATE

PRECLASS PREPARATION

EQUIPMENT LOCATED IN LABORATORY	EQUIPMENT FROM SUPPLY	CLASSIFIED MATERIAL	GRAPHIC AIDS AND UNCLASSIFIED MATERIAL
Scales and counter balances Graduated cylinders Beakers			SG 3ABR56630-II-1 WB 3ABR56630-II-1-P1 CDC Manual, Insecticides for the Control of Insects of Public Health Importance AFM 91-16

CRITERION OBJECTIVES AND TEACHING STEPS

1a. Using technical data provided and AFM 91-16, describe and list components of various pesticide formulations

- (1) Technical grade insecticides
- (2) Organic solvents
- (3) Diluents (carriers)
- (4) Components of various formulations

1b. Using technical data provided, describe the methods of dispersing pesticides

- (1) Liquid
- (2) Solid
- (3) Conditions under which various methods are used

1c. Given appropriate formulas from AFM 91-16, calculate and formulate pesticide dilutions and dosages for assigned problems and situations.

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LESSON PLAN (Part I, General) CONTINUATION SHEET

CRITERION OBJECTIVES AND TEACHING STEPS (Continued)

(1) Dilution formula problems
(2) Linear application problems
(3) Area application problems
(4) Problems in structural pest control

1d. Given appropriate forms and guidance, complete records of chemicals used and areas treated in accordance with directives.

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LESSON PLAN (Part I, General)

APPROVAL OFFICE AND DATE CETC 9 JUN 1975	INSTRUCTOR
COURSE NUMBER 3ABR56630	COURSE TITLE Entomology Specialist
BLOCK NUMBER II	BLOCK TITLE Control of Medically Important Pests

LESSON TITLE
Systematic Biology (Day 14)

LESSON DURATION

CLASSROOM/Laboratory	Complementary	TOTAL
2 Hrs	1 Hr	3 Hrs

POI REFERENCE

PAGE NUMBER	PAGE DATE	PARAGRAPH
17	15 May 1975	2

STS/CTS REFERENCE

NUMBER	DATE
STS 566X0	7 November 1974

SUPERVISOR APPROVAL

SIGNATURE	DATE	SIGNATURE	DATE

PRECLASS PREPARATION

EQUIPMENT LOCATED IN LABORATORY	EQUIPMENT FROM SUPPLY	CLASSIFIED MATERIAL	GRAPHIC AIDS AND UNCLASSIFIED MATERIAL
None	None	None	SG 3ABR56630-II-2 WB 3ABR56630-II-2-P1 AFM 91-16 CDC, Pictorial Keys to Some Arthropods and Mammals CDC, Key to Stored Products Pests

CRITERION OBJECTIVES AND TEACHING STEPS

2a. Using reference materials provided, correlate the taxonomic characteristics of an insect to man.

(1) Identification
(2) Classification
(3) Nomenclature

2b. Using reference materials provided, identify the most important phylum from the stand point of human suffering and economic loss.

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LESSON PLAN (Part I, General)

APPROVAL OFFICE AND DATE TCETC 9 JUN 1975	INSTRUCTOR
COURSE NUMBER 3ABR56630	COURSE TITLE Entomology Specialist
BLOCK NUMBER II	BLOCK TITLE Control of Medically Important Pests

LESSON TITLE
General Biology of the Arthropods (Day 14)

LESSON DURATION

CLASSROOM /Laboratory 2 Hrs	Complementary 1 Hr	TOTAL 3 Hrs

POI REFERENCE

PAGE NUMBER 18	PAGE DATE 15 May 1975	PARAGRAPH 3

STS/CTS REFERENCE

NUMBER STS 566X0	DATE 7 November 1974

SUPERVISOR APPROVAL

SIGNATURE	DATE	SIGNATURE	DATE

PRECLASS PREPARATION

EQUIPMENT LOCATED IN LABORATORY	EQUIPMENT FROM SUPPLY	CLASSIFIED MATERIAL	GRAPHIC AIDS AND UNCLASSIFIED MATERIAL
None	None	None	SG 3ABR56630-II-3 WB 3ABR56630-II-3-P1 CDC Manual: Introduction to Arthropods of Public Health Importance

CRITERION OBJECTIVES AND TEACHING STEPS

3a. Research technical data referenced in study guide and list the characteristics of phylum arthropoda

(1) Exoskeleton
(2) Jointed appendages
(3) Segmented body

3b. Research technical data referenced in study guide and list the major differences in body systems of insects and those of higher animals

(1) Internal structure of an insect
(2) Internal structure of higher animals
(3) Physiology of insects and higher animals

3c. Research technical data provided and list the characteristics of the class Insecta

LESSON PLAN (Part I, General) CONTINUATION SHEET

CRITERION OBJECTIVES AND TEACHING STEPS (Continued)

(1) One pair of antennae
(2) Three body regions
(3) Three pairs of legs

3d. Research technical data provided and list the usual basis for insect classification

(1) Wings
(2) Mouth parts
(3) Metamorphosis
(4) Special characteristics

3e. Research technical data provided and list the beneficial aspects of arthropods

(1) Pollination
(2) Production of commerical materials
(3) Maintaining the balance of nature
(4) Useful in scientific research

LESSON PLAN (Part I, General)

APPROVAL OFFICE AND DATE TCETC , 9 JUN 1975	INSTRUCTOR
COURSE NUMBER 3ABR56630	COURSE TITLE Entomology Specialist
BLOCK NUMBER II	BLOCK TITLE Control of Medically Important Pests

LESSON TITLE
Venomous Animals (Day 14)

LESSON DURATION

CLASSROOM/Laboratory	Complementary	TOTAL
2 Hrs		2 Hrs

POI REFERENCE

PAGE NUMBER	PAGE DATE	PARAGRAPH
19	15 May 1975	4

STS/CTS REFERENCE

NUMBER	DATE
STS 566X0	7 November 1974

SUPERVISOR APPROVAL

SIGNATURE	DATE	SIGNATURE	DATE

PRECLASS PREPARATION

EQUIPMENT LOCATED IN LABORATORY	EQUIPMENT FROM SUPPLY	CLASSIFIED MATERIAL	GRAPHIC AIDS AND UNCLASSIFIED MATERIAL
None	None	None	SG 3ABR56630-II-4 WB 3ABR56630-II-4-P1 CDC Manual, Spiders scorpions, and other arthropods and their control TF, SFP-1589

CRITERION OBJECTIVES AND TEACHING STEPS

4a. Using technical data provided and specimen, identify the important venomous animals

(1) Arthropods
(2) Reptiles

4b. Using technical information provided, list and describe methods for which venoms are introduced.

(1) Bite
(2) Sting
(3) Contact
(4) Active projection

4c. Using technical data provided, describe the modes of action of animal venoms

(1) Vesicating

LESSON PLAN (Part I, General) CONTINUATION SHEET

CRITERION OBJECTIVES AND TEACHING STEPS (Continued)

(2) Neurotoxic
(3) Hemolytic
(4) Haemorhagic
(5) Urticating

4d. Using referenced materials provided, describe the control measures required for venomous animals

(1) Physical
(2) Chemical

LESSON PLAN (Part I, General)

APPROVAL OFFICE AND DATE TCETC [illegible] 1975	INSTRUCTOR
COURSE NUMBER 3ABR56630	COURSE TITLE Entomology Specialist
BLOCK NUMBER II	BLOCK TITLE Control of Medically Important Pests

LESSON TITLE
Mosquitoes (Days 15 and 16)

LESSON DURATION

CLASSROOM /Laboratory	Complementary	TOTAL
8 Hrs	4 Hrs	12 Hrs

POI REFERENCE

PAGE NUMBER	PAGE DATE	PARAGRAPH
21	15 May 1975	5

STS/CTS REFERENCE

NUMBER	DATE
STS 566X0	7 November 1974

SUPERVISOR APPROVAL

SIGNATURE	DATE	SIGNATURE	DATE

PRECLASS PREPARATION

EQUIPMENT LOCATED IN LABORATORY	EQUIPMENT FROM SUPPLY	CLASSIFIED MATERIAL	GRAPHIC AIDS AND UNCLASSIFIED MATERIAL
Laboratory Optical Instruments Mosquito Survey equipment Aerosol generators Hydraulic sprayers Hand operated dispersal equipment Mosquito specimens	Truck, stake & platform 1½ ton		SG 3ABR56630-II-5 SG 3ABR56630-II-5-P1 AFM 91-16 CDC Manual, Mosquitoes and their control Technical Manual, Operation and Maintenance of Dispersal Equipment TM-5-3740-200-15 TF: M-191, M-127

CRITERION OBJECTIVES AND TEACHING STEPS

5a. Using reference materials provided describe in student discussion and record the role of mosquitoes in disease transmission

(1) Diseases transmitted
(2) Modes of transmission
(3) Conditions conducive to disease transmission

5b. Using reference materials provided, describe in student discussion and record the biological factors that must be considered in selection and planning control measures.

(1) Life cycle
(2) Habitat
(3) Behavior

5c. Using identification keys and specimens, identify the important genera of mosquitoes

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LESSON PLAN (Part I, General) CONTINUATION SHEET

CRITERION OBJECTIVES AND TEACHING STEPS (Continued)

(1) Anophelines
(2) Culicines

5d. Using equipment provided, perform mosquito survey and collection procedures in accordance with data referenced in study guide.

(1) Larva
(2) Adult

5e. Using technical manuals provided, list the methods of minimizing disease transmission

(1) Personal protection
(2) Chemical controls
(3) Mechanical controls
(4) Biological controls
(5) Coordination with other agencies

5f. Using equipment and technical manuals provided, and under the direction of instructors, perform mosquito control measures in a real or simulated situation

(1) Larvaciding
(2) Space spraying
(3) Residual spraying
(4) Drainage of water areas

LESSON PLAN (Part I, General)

APPROVAL OFFICE AND DATE TCETC 9 JUN 1975	INSTRUCTOR
COURSE NUMBER 3ABR56630	COURSE TITLE Entomology Specialist
BLOCK NUMBER II	BLOCK TITLE Control of Medically Important Pests

LESSON TITLE
Flies (Days 16 and 17)

LESSON DURATION

CLASSROOM /Laboratory	Complementary	TOTAL
8 Hrs	2 Hrs	10 Hrs

POI REFERENCE

PAGE NUMBER	PAGE DATE	PARAGRAPH
22	15 May 1975	6

STS/CTS REFERENCE

NUMBER	DATE
STS 566X0	7 November 1974

SUPERVISOR APPROVAL

SIGNATURE	DATE	SIGNATURE	DATE

PRECLASS PREPARATION

EQUIPMENT LOCATED IN LABORATORY	EQUIPMENT FROM SUPPLY	CLASSIFIED MATERIAL	GRAPHIC AIDS AND UNCLASSIFIED MATERIAL
Microscopes Fly survey equipment Mist-dust blowers Hydraulic sprayers Hand sprayers Fly specimens	Truck, stake and platform, 1½ ton		SG 3ABR56630-II-6 WB 3ABR56630-II-6-P1 AFM 91-16 CDC Manual, Flies and their control Technical Manuals: Operations and Maintenance Instructions for Dispersal equipment (over)

CRITERION OBJECTIVES AND TEACHING STEPS

6a. Using reference materials provided, correctly describe the role of flies in disease transmission

(1) Disease transmitted
(2) Modes of transmission
(3) Conditions conducive to disease transmission

6b. Using references provided, describe the biological factors of flies that must be considered in selecting and planning control measures.

(1) Life cycle
(2) Habitat
(3) Behavior

6c. Using identification keys and fly specimens, identify by matching keys to the specimens

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LESSON PLAN (Part I, General) CONTINUATION SHEET

CRITERION OBJECTIVES AND TEACHING STEPS (Continued)

PRECLASS PREPARATION

GRAPHIC AIDS AND UNCLASSIFIED MATERIALS

Training Films: Community Fly Control Operations and Biology

6d. Using equipment provided, perform fly survey and collection procedures in accordance with AFM 91-16

6e. Researching selected technical manuals, list and record the methods of minimizing fly-borne diseases.

(1) Sanitation
(2) Mechanical controls
(3) Chemical controls
(4) Physical controls

6f. Using equipment and technical manuals provided, and under the direction of the instructors, perform fly control operations in a real or simulated situation

(1) Larvaciding
(2) Residual treatments for adults
(3) Fly bait placement

LESSON PLAN (Part I, General)

APPROVAL OFFICE AND DATE TCETC 9 JUN 1975	INSTRUCTOR
COURSE NUMBER 3ABR56630	COURSE TITLE Entomology Specialist
BLOCK NUMBER II	BLOCK TITLE Control of Medically Important Pests

LESSON TITLE
Ectoparasites (Days 17 and 18)

LESSON DURATION

CLASSROOM /Laboratory	Complementary	TOTAL
8 Hrs	2 Hrs	10 Hrs

POI REFERENCE

PAGE NUMBER	PAGE DATE	PARAGRAPH
24	15 May 1975	7

STS/CTS REFERENCE

NUMBER	DATE
STS 566X0	7 November 1974

SUPERVISOR APPROVAL

SIGNATURE	DATE	SIGNATURE	DATE

PRECLASS PREPARATION

EQUIPMENT LOCATED IN LABORATORY	EQUIPMENT FROM SUPPLY	CLASSIFIED MATERIAL	GRAPHIC AIDS AND UNCLASSIFIED MATERIAL
Pest Specimen Set, Ectoparasites Mist-Dust Blowers Hand Sprayer/Dusters	Truck, stake & platform, 1½ ton	None	SG 3ABR56630-II-7 WB 3ABR56630-II-7-P1 AFM 91-16 Technical Manuals: Opr & Maint of Dispersal Equipment (over)

CRITERION OBJECTIVES AND TEACHING STEPS

7a. Using reference materials provided, describe role of ectoparasites in disease transmission.

(1) Fleas
(2) Lice
(3) Ticks
(4) Mites

7b. Using reference materials provided, describe and list the biological factors of each ectoparasite that must be considered in selecting and planning control measures.

(1) Life cycle
(2) Habitat

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LESSON PLAN (Part I, General) CONTINUATION SHEET

CRITERION OBJECTIVES AND TEACHING STEPS (Continued)

PRECLASS PREPARATION

GRAPHIC AIDS AND UNCLASSIFIED MATERIAL

CDC Manuals: Fleas of Public Health
and their control,
Ticks of Public Health Importanc
and their Control,
Mites as Public Health Importanc
and their Control
Training Films: FLC 20/60, MN 4049

7c. Using identification keys and specimens provided, identify selected species of ectoparasites

7d. Using equipment provided, perform ectoparasite survey using standard collection procedures

7e. Using prescribed spray equipment and technical manuals, and under the direction of instructors perform ectoparasite control measures

(1) Spot treatments
(2) Area treatments

LESSON PLAN (Part I, General)

APPROVAL OFFICE/DATE TCETC 9 JUN 1975	INSTRUCTOR
COURSE NUMBER 3ABR56630	COURSE TITLE Entomology Specialist
BLOCK NUMBER II	BLOCK TITLE Control of Medically Important Pests

LESSON TITLE
Domestic Rodents (Day 19)

LESSON DURATION

CLASSROOM /Laboratory	Complementary	TOTAL
6 Hrs	2 Hrs	8 Hrs

POI REFERENCE

PAGE NUMBER	PAGE DATE	PARAGRAPH
26	15 May 1975	8

STS/CTS REFERENCE

NUMBER	DATE
STS 566X0	7 November 1974

SUPERVISOR APPROVAL

SIGNATURE	DATE	SIGNATURE	DATE

PRECLASS PREPARATION

EQUIPMENT LOCATED IN LABORATORY	EQUIPMENT FROM SUPPLY	CLASSIFIED MATERIAL	GRAPHIC AIDS AND UNCLASSIFIED MATERIAL
Traps	Truck, stake and platform 1½ ton		SG 3ABR56630-II-8 WB 3ABR56630-II-8-P1 AFM 91-16 CDC Manuals: Rodent Erad. & Poisoning Programs, Biological Factors in Domestic Rodent Control TF: TF1-8104, TF-1670

CRITERION OBJECTIVES AND TEACHING STEPS

8a. Using reference materials provided, describe and list the role of domestic rodents in disease transmission and economic class.

(1) Diseases transmitted
(2) Modes of transmission
(3) Conditions conducive to rodent-borne disease transmission
(4) Economic loss

8b. Using reference materials provided, describe the biological factors of domestic rodents that must be considered in selecting and planning control procedures.

(1) Life cycle
(2) Habitat
(3) Behavior

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LESSON PLAN (Part I, General) CONTINUATION SHEET

CRITERION OBJECTIVES AND TEACHING STEPS (Continued)

8c. Using identification keys and specimens provided, identify important species of domestic rodents

8d. Using equipment provided, perform rodent survey and collection procedures in accordance with AFM 91-16

8e. Using technical manuals provided, list and record the methods of minimizing rodent-borne diseases and economic lost

(1) Sanitation
(2) Mechanical controls
(3) Physical controls
(4) Chemical controls
(5) Coordination with other agencies

8f. Using equipment and technical manuals provided, and under the direction of the instructors, perform rodent control measures by setting traps and dispersing baits as required for poisoning operations

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LESSON PLAN (Part I, General)

APPROVAL OFFICE AND DATE TCETC 9 JUN 1975	INSTRUCTOR
COURSE NUMBER 3ABR56630	COURSE TITLE Entomology Specialist
BLOCK NUMBER II	BLOCK TITLE Control of Medically Important Pests

LESSON TITLE
Field Rodents and Other Vertebrates (Day 20)

LESSON DURATION

CLASSROOM/Laboratory	Complementary	TOTAL
4 Hrs		4 Hrs

POI REFERENCE

PAGE NUMBER	PAGE DATE	PARAGRAPH
27	15 May 1975	9

STS/CTS REFERENCE

NUMBER	DATE
STS 566X0	7 November 1974

SUPERVISOR APPROVAL

SIGNATURE	DATE	SIGNATURE	DATE

PRECLASS PREPARATION

EQUIPMENT LOCATED IN LABORATORY	EQUIPMENT FROM SUPPLY	CLASSIFIED MATERIAL	GRAPHIC AIDS AND UNCLASSIFIED MATERIAL
Bird Traps Animal Traps Binoculars Exploder, Carbide type	None	None	Training Films: MN-440, SFP 1589, USAF Film Report#851, FLC2-0147 NCDC Pictorial Keys SF 3ABR56630-II-9 WB 3ABR56630-II-9-P1 AFM 91-16 CDC Manuals:Pictorial Keys

CRITERION OBJECTIVES AND TEACHING STEPS

9a. Using identification keys and technical manuals provided, name some medically and economically important vertabrate pests

(1) Major diseases and economic loss
(2) Conditions conducive to disease outbreaks
(3) Habits and descriptions of venomous snakes

9b. Using technical manuals provided, name in student discussion the precautions necessary when handling field rodents and predatory animals

(1) Scratches and bites
(2) Proper equipment
(3) First Aid procedures for snake bites

9c. Using selected references, list the biological factors necessary to the identification and control of common pest birds.

ATC FORM AUG 72 770

LESSON PLAN (Part I, General) CONTINUATION SHEET

CRITERION OBJECTIVES AND TEACHING STEPS (Continued)

(1) Habitat
(2) Behavior
(3) Physical characteristics

9d. Using technical manuals provided, state the basic control measures for vertebrates

(1) Survey-Collection
(2) Exclusion
(3) Sanitation
(4) Repellants
(5) Mechanical
(6) Chemical

9e. Using equipment and technical data provided, collect, identify, and record results of selected specimens of vertebrate species.

(1) Trapping
(2) Poison baits

9f. Practice procedures for coordination with other agencies to confirm identification, breeding, habits and appearance cycles of pests in accordance with AFM 91-16

9g. Perform reviews of local data and records at CE entomology section to determine local cyclical characteristics of pests.

9h. Using reference materials provided, determine and record in workbook the injurious effects of insects and other pests.

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STUDY GUIDES 3ABR56630-II-1 thru 9

Department of Civil Engineering Training

Entomology Specialist

CONTROL OF MEDICALLY IMPORTANT PESTS

July 1975

SHEPPARD AIR FORCE BASE

Designed For ATC Course Use

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This supersedes SG 3ABR56630-II-1 thru -9, 17 September 1973
Copies of the superseded publication may be used until the supply is exhausted.)

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Dept of Civil Engineering Training
Sheppard AFB, Texas

SG 3ABR56630-II-1
July 1975

PESTICIDE FORMULATION CALCULATIONS

Days 11, 12, 13

OBJECTIVE

When you have completed the assignment in this study guide, you will be able to calculate dosages for pesticide applications using dilution, linear application, area application, and structural pest control formulas. You will also have a knowledge of the records that must be kept on chemicals and treated areas.

INTRODUCTION

The entomology specialist must be able to properly calculate formulations in order to maximize a safe standard of operation. This lesson will enable you to properly mix pesticide formulations and disperse pesticides effectively.

STUDY ASSIGNMENT

1. AFM 91-16, Tables B-1 thru B-19 and Table G-1.
2. HO 3ABR56630-II-1-H1, Calculations of Dosages.
3. CDC (Center for Disease Control), Insecticides for the Control of Public Health Importance.

QUESTIONS

1. What is DD Form 1070 used for and how often should it be filled out?
2. Explain the steps involved in calculating the amount of insecticide necessary to treat for termites.
3. Explain the importance of properly calculating the amount of pesticide to be used in an actual field control situation.

SYSTEMATIC BIOLOGY
Day 14

OBJECTIVE

Systematic biology deals with the classification of living organisms. The objective of this lesson is to acquaint the student with the use of keys that are used for identification of arthropods and mammals. By understanding the principles involved, the student will be able to work any key necessary in the performance of his duties.

INTRODUCTION

This assignment lays the foundation in the use of keys for the proper identification of insect and rodent specimens. Keys are a necessity for the proper identification of all living organisms, and understanding the mechanics is essential.

STUDY ASSIGNMENT

1. CDC, Pictorial Keys to Some Arthropods and Mammals of Public Health Importance.
2. CDC, Key to Some Beetles Commonly Found in Stored Foods.
3. CDC, Introduction to Arthropods of Public Health Importance.

QUESTIONS

1. Distinguish between the rice weevil and the granary weevil using the Key to Some Beetles Found in Stored Foods.
2. Using the Pictorial Key to Some Arthropods and Mammals of Public Health Importance, distinguish hard ticks from soft ticks.
3. What distinguishes tarantulas from other spiders in the Pictorial Key to Some Arthropods and Mammals of Public Health Importance?
4. Using the Key to Some Common Classes and Orders of Arthropoda (found in CDC, Introduction to Arthropods of Public Health Importance), list all the characteristics of the order hymenoptera.
5. What is meant by a couplet key?

SG 3ABR56630-II-3
September 1973

GENERAL BIOLOGY OF THE ARTHROPODS
Day 14

OBJECTIVE

The objective is to introduce the student to the arthropods of public health importance and to give them an understanding of how the arthropods became such an important phylum.

INTRODUCTION

Arthropods are the most successful of all land animals. Their external and internal structure reveals their cause of success. The classes and orders of public health importance will be examined.

STUDY ASSIGNMENT

CDC, Introduction to Arthropods of Public Health Importance.

QUESTIONS

1. Name the organs for excretion.
2. Name the external respiratory openings of insects.
3. List the three types of insect mouthparts.
4. Describe the types of metamorphosis and give examples.
5. In insects, what is the main purpose of the second body region?

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VENOMOUS ANIMALS
Day 14

OBJECTIVE

Upon completion, each student will have become acquainted with the biology, identification, and control of venomous arthropods and animals.

INTRODUCTION

This study assignment reviews the venomous arthropods, that, in relation to disease vectors, are of limited importance to the entomologist. Recently, however, hospital admissions of personnel because of bites and stings by venomous arthropods have exceeded the number admitted due to snakebite.

STUDY ASSIGNMENT

1. AFM 91-16, Chapter 7, Section 13.
2. CDC, Spiders, Scorpions, and Other Arthropods of Public Health Importance and Their Control.

QUESTIONS

1. The only poisonous scorpions in the United States are found in what genus?
2. List the distinguishing characteristics of the class arachnida.
3. In what ways can venomous animals inflict injury to humans?

SG 3ABR56630-II-5
July 1975

MOSQUITOES
Days 15 and 16

OBJECTIVE

The objective is to explain the biology, identification, and control of mosquitoes. The biology and control of mosquitoes in general will be examined and the important mosquito genera will be identified.

INTPODUCTION

Mosquitoes constitute the most important single insect group from the standpoint of both disease transmission and annoyance. They are distributed from the Arctic to the Tropics, wherever man finds water. There are over 1600 described species with a great variety of habits which make a knowledge of mosquito identification and biology essential for efficient control.

STUDY ASSIGNMENT

1. AFM 91-16, Chapter 7, Section 1.
2. CDC, Mosquitoes of Public Health Importance and Their Control.

QUESTIONS

1. What three genera are of particular concern as carriers of disease?
2. Which genus is the sole vector of malaria?
3. Which mosquito is the sole vector of yellow fever?
4. Are mosquitoes mechanical vectors or biological vectors?

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SG 3ABR56630-II-6
July 1975

FLIES
Days 16 and 17

OBJECTIVE

The objective is to introduce the student to the proper identification and control of pest flies. The flies studied may be disease vectors or annoying pests.

INTRODUCTION

It is recognized that flies constitute one of the greatest public health hazards and that the abatement of fly populations is essential. The control of flies is dependent on accurate recognition of species and knowledge of the life cycle and habits of problem species.

STUDY ASSIGNMENT

1. AFM 91-16, Chapter 7, Sections 2 and 3.
2. CDC, Flies of Public Health Importance and Their Control.

QUESTIONS

1. Define the term myiasis and its relationship to flies.
2. Name five causative organisms which flies can carry and an example of a disease caused by each.
3. What disease is vectored th the tsetse fly?
4. What is the basic requirement for effective domestic fly control?

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SG 3ABR56630-II-7
July 1975

ECTOPARASITES
Days 17 and 18

OBJECTIVE

The objective is to acquaint the student with the medical and economic importance of various ectoparasites and also their effective identification.

INTRODUCTION

Ectoparasites are all potential disease vectors. The most important ones are the fleas, lice, ticks, and the mites. Of these, the ticks rank second to the mosquitoes as vectors of human disease.

STUDY ASSIGNMENT

1. AFM 91-16, Sections 5, 6, and 12.
2. CDC, Fleas of Public Health Importance and Their Control.
3. CDC, Lice of Public Health Importance and Their Control.
4. CDC, Ticks of Public Health Importance and Their Control.
5. CDC, Mites of Public Health Importance and Their Control.

QUESTIONS

1. Name the two combs found on fleas used in the identification of species.
2. List three diseases known to be vectored by fleas.
3. What is the organism that causes typhus fever vectored by ticks?
4. Identify the stages in the life cycle of a mite.
5. Identify the stages in the life cycle of a louse.

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SG 3ABR56630-II-8
July 1975

DOMESTIC RODENTS
Day 19

OBJECTIVE

The objective of this lesson is to provide the student with the proper knowledge and skills required to carry out effective identification and control of domestic rodents.

INTRODUCTION

Man has been combating rats and mice across much of the earth for hundreds of years. His control efforts have taken on numerous forms. This assignment reviews rodent habits, identification, trapping, and poisoning programs for effective control.

STUDY ASSIGNMENT

1. AFM 91-16, Chapter 3, Section 2; Chapter 9, Section 1.
2. CDC, Rodent Eradication and Poisoning Programs.
3. CDC, Biological Factors in Domestic Rodent Control.

QUESTIONS

1. Name the two main types of rodenticides.
2. Which rodenticide is most useful for control of the house mouse?
3. What are rub marks?
4. Describe how to properly set a snap trap for rodent control.
5. In rodent control, why are live traps essential in some cases?

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SG 3ABR56630-II-9
July 1975

FIELD RODENTS AND OTHER VERTEBRATES
Day 20

OBJECTIVE

The objective is to explain the importance of field rodents and other vertebrates, emphasizing that they may be possible reservoirs for disease carrying ectoparasites. In fact, these animals may be direct vectors of disease.

INTRODUCTION

Field rodents often constitute a problem, particularly in the western part of the United States. They frequently destroy crops and can create hazards at airport runways. They can also pose a health hazard in rodent-borne disease situations.

STUDY ASSIGNMENT

1. AFM 91-16, Chapter 9, Section 2.
2. CDC, Pictorial Keys

QUESTIONS

1. What is the best means of recovering ectoparasites from field rodents?
2. What must take place in order for field rodents to transmit their diseases to humans?
3. Are poisoning programs effective for field rodent control?
4. How can field rodents be distinguished from domestic rodents?

WORKBOOKS 3ABR56630-II-1-P1 thru 9-P1

Department of Civil Engineering Training

Entomology Specialist

CONTROL OF MEDICALLY IMPORTANT PESTS

17 September 1973

SHEPPARD AIR FORCE BASE

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Dept of Civil Engineering Training
Sheppard AFB, Texas

WB 3ABR56630-II-1-P1
17 September 1973

PESTICIDE FORMULATION CALCULATIONS

OBJECTIVE

Upon completion of this workbook, you will be able to formulate pesticides using dilution, linear application, area application, and structural pest control formulas.

1. List the basic types of pesticides.

a. ____________________ b. ____________________

c. ____________________ d. ____________________

2. List the types of supplementary materials.

a. ____________________ b. ____________________

c. ____________________ d. ____________________

e. ____________________ f. ____________________

3. Define each of the following:

a. Pesticide - ____________________

b. Insecticide - ____________________

c. Fungicide - ____________________

d. Rodenticide - ____________________

e. Emulsifiable concentrate - ____________________

f. Wettable powder - ____________________

4. List the main characteristics of each of the following:

a. Technical grade insecticide ____________________

____

b. Dust ____________________

c. Suspensions ____________________

d. Solutions ____________________

e. Emulsions ____________________

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5. Define the following:

a. Fumigant ____________________________________

b. Aerosol ____________________________________

c. Fog ____________________________________

d. Mist ____________________________________

e. Spray ____________________________________

6. The following problems will give you some practice in formulating pesticides. Enter your answer in the blanks provided for each problem and be prepared to mix the formulations.

a. Prepare 2 gal. of 0.5% lindane emulsion using 20% emulsifiable concentrate.

__________ fl. oz. of concentrate is required.

b. Prepare 2 gal. of 2.5% chlordane emulsion using 46% emulsifiable concentrate.

__________ fl. oz. of concentrate is required.

c. Prepare 2 gal. of 2% chlordane solution in kerosene using 46% emulsifiable concentrate. __________ fl. oz. of concentrate is required.

d. Prepare 2 gal. of 2% malathion solution using 56% emulsifiable concentrate.

__________ fl. oz. of concentrate is required.

e. Prepare 500 gal. of 8% malathion for solution in #2 diesel fuel using 20% airplane spray. __________ gal. concentrate is required.

f. If lindane 20% emulsifiable concentrate is mixed with water at the rate of 5 gal. of concentrate to 95 gal. of water to make 100 gal. of finished spray, what is the percent of lindane in the finished spray? __________ % lindane.

g. You have 1 gal. of 25% diazinon emulsifiable concentrate which weighs 8.3 lbs.

(1) How much diazinon does it contain? ________________

(2) How much diazinon would there be in 30 gal. of this concentrate? ________

h. Prepare 5 gal. of 0.5% sevin suspension using 25% wettable powder. ________ oz. of concentrate is required.

i. Prepare 50 lb. of 10% malathion dusting powder using 75% wettable powder.

________ oz. of concentrate required.

j. Prepare 5 lb. of warfarin bait using 0.5% concentrate to a finished product of 0.025%. __________ oz. concentrate is required.

k. You have 15 lbs. of 75% malathion water dispersible powder. How many lbs. of 10% dusting powder can be made? ____________lbs. ___________oz.

l. How many gallons of 0.5% dieldrin spray can be made from 75 lbs. of 50% dieldrin water dispersible powder? ___________gal.

m. How many lbs. of 75% water dispersal powder will be needed to make 50 gal. of 5% diazinon spray? ____________ lbs. __________oz.

n. If 75% malathion water dispersible powder is mixed at the rate of 1 lb. of powder to 75 gal. of water, what is the percent of malathion in the finished spray?

____________%.

o. How many lbs. of 10% malathion dusting powder can be made from 25 lbs. of 75% malathion water dispersible powder? __________lbs. ________oz.

LINEAR AND AREA APPLICATION PROBLEMS

p. A parade ground is 350 ft. long and 200 ft. wide.

   (1) How many square feet are there? ______________________________

   (2) How many acres? __________________________

q. What is the volume of a building 80 ft. by 30 ft. with 8 ft. ceilings?

________________ cu. ft.

r. The exterior walls of a building 60 ft. long by 40 ft. wide, with 10 ft. ceilings, are to be treated on the inside with pesticide. What is the area to be treated?

(Do not consider doors and windows.) ________________sq. ft.

s. A recommendation calls for application of an outdoor aerosol treatment at a rate of 5 ga.. per mile. The flow rate of the dispersal equipment is 40 gal. per hour. At what speed should the vehicle travel? ____________m.p.h.

t. A lawn 50 ft. by 25 ft. is to be treated at a rate of 20 gal. per acre.

(1) How many gallons are required? ______________

(2) How many pints? ______________

u. A recommendation calls for the application of malathion emulsion at a rate of one lb. of malathion per acre to control armyworms. There are 2 acres to be covered and the available equipment delivers 6 gal. per minute. The equipment is to be mounted on a pickup truck which will travel at about 5 m.p.h. and the spray will have an effective swath width of about 50 ft. 57% malathion emulsifiable concentrate will be used.

(1) How many gal. per acre will be applied? ______________

(2) What percent malathion spray will be used? ______________

(3) How much of this spray will be required? ______________

(4) How much of the emulsifiable concentrate will be used? ______________

v. A recommendation calls for the application of chlordane dust at a rate of 1 lb. per acre. You have a 50% dust and a dust blower which has an output rate of 5 lb. per minute and an effective swath width of 300 ft. At what speed should you operate the vehicle on which the duster is mounted to obtain the recommended dosage of 1 lb. per acre? ______________

w. Instructions call for the application of an area mist treatment with a Buffalo Turbine using a 4% malathion emulsion. The flow rate with the fine mist nozzles is 2.5 gal. per minute and the vehicle will travel at 5 m.p.h. An effective swath width of 300 ft. is estimated. How many gal. per acre of 4% malathion will be applied? ______________

x. Area mosquito control with BHC dust at a dosage rate of 0.1 lb. per acre is planned. The dosage is to be obtained by applying 3.3 lb. of 3% gamma BHC. 12% gamma BHC dust is available.

(1) How much of the 12% gamma BHC and how much talc or pyrophyllite must be mixed to obtain 100 lb. of 3% dust?

______________lb. BHC

______________lb. talc or pyrophyllite

(2) You are going to apply this with a Buffalo Turbine and calibrate the output at 6 lb. per minute. An effective swath width of 200 ft. is estimated. At what speed should you operate the tow vehicle to obtain the required dosage of 3.3 lb. per acre? ______________

y. You are to make a residual application of insectcide to the interior walls of a warehouse which is 18 ft. high, 100 ft. long, and 40 ft. wide. The rate is to 1 gal per 1,000 sq. ft. How many gallons are required? ____________________

z. An area to be treated with an aerosol is found to be 10 ft. high, 275 ft. long, and 25 ft. wide. What is its volume in terms of cu. ft.

7. The following problems will give you practice in treating structures and soils for termites and other structural pests.

a. List the chemicals that are suitable as poisons for the control of termites.

(1) ____________________ (2) ____________________

(3) ____________________ (4) ____________________

b. Determine the number of feet around a building 150 ft. long and 25 ft. wide.

____

c. Determine the number of feet around a building 325 ft. long and 75 ft. wide.

____

d. What is the distance that must be trenched around and inside a foundationed building 300 ft. long and 85 ft. wide? ____________________

e. Calculate the number of feet to trench around and inside the foundation of a building 175 ft. long and 75 ft. wide. ____________________

f. Using Table G-1 in AFM 91-16, determine how much chlordane would be necessary for 350 linear feet of trench. ____________gal.

g. For sub slab injection, how many holes are to be drilled in a 30 ft. sq.? _____

h. For sub slab injection, how many holes must be drilled in a slab 75 ft. long and 20 ft. wide?

(1) ____________holes.

(2) How much chlordane is needed? ____________gals.

(3) How much concentrate is needed? ____________gals.

i. Describe the procedures for correction treatment for drywood termites.

____

____

j. Describe the procedures for corrective treatment of subterranean termites.

____

____

____

k. Describe the procedures for corrective treatment of fungi in wood.

____

____

l. You inspected a building and found that it is infested with subterranean termites. You are called upon to treat the building. The building is a pier and beam type structure 60 ft. by 100 ft. with a concrete foundation completely around the building. There are 45 2 ft. by 2 ft. piers under the building. In one corner of the building there is a boiler room 20 ft. by 20 ft. that has a concrete slab floor. On one side of the building there is a 60 ft. long concrete slab porch.

(1) Describe in detail the procedures for treating the building.

____

____

____

____

(2) How many linear feet are to be trenched? ____________________

(3) How many holes are to be drilled? ____________________

(4) Type of concentrate to be used. ____________________

(5) Amount of concentrate to be used. ____________________

(6) Total number of gallons of formulation. ____________________

(7) Total cost of chemical concentrate. $____________________

m. Accomplish DD Form 1070 on a building chosen by the instructor. Turn the form in for approval.

SYSTEMATIC BIOLOGY

OBJECTIVE

Upon completion of this workbook, you will be able to classify animals into the proper phylum and identify the principles of systematic biology.

1. Define the following terms:

   a. Systematic biology ______________________________

   b. Taxonomy ______________________________

   c. Binomial system of nomenclature ______________________________

   d. Groups of living things ______________________________

   e. Species ______________________________

2. In the blank spaces below, list the classification of man and the housefly.

	Man	Housefly
Kingdom		
Phylum		
Class		
Order		
Family		
Genus		
Species		

3. List the identifying characteristics of the phylum Arthropoda.

   a. ______________________________

b. ____

c. ____

4. List the identifying characteristics of the class Insecta.

a. ____

b. ____

c. ____

5. The two names commonly given to an animal are the ______________ name and the ______________ name.

6. From the standpoint of human suffering and economic loss, the ______________ is the most important phylum to man.

7. Identification of insect specimens is best accomplished by the use of __________.

8. Name and describe the two most widely used types of keys.

a. ____

____

b. ____

____

9. The Air Force Manual of most use in entomology work is AFM ______________.

10. Explain how a scientific name should be written and give an example.

____

____

____

11. Who was Carl Von Linnaeus? ______________________________

____

GENERAL BIOLOGY OF THE ARTHROPODS

OBJECTIVE

Upon completion of this workbook you will be able to describe the general biology of the arthropods from a physiological standpoint.

1. Describe the difference in internal structure between arthropods and man, especially the respiratory and circulatory systems.

____

____

____

____

2. List the types of insect mouthparts. ____________________

____

____

3. List the three types of metamorphosis and the stages of each.

a. ____________________

b. ____________________

c. ____________________

4. Describe the four different types of structured wings and the orders to which they belong.

a. ____________________

b. ____________________

c. ____________________

d. ____________________

5. List five ways arthropods can be beneficial to man.

a. ____________________

b. ____________________

c. ____________________

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d. ____________________

e. ____________________

6. What is the most important class of arthropods from the economic and disease vector standpoint? ____________________

7. List the three main body regions of insects.

a. ____________________

b. ____________________

c. ____________________

8. Name and describe the type of skeleton that insects possess.

____

____

9. List five systems of the insect's internal structure.

a. ____________________ b. ____________________

c. ____________________ d. ____________________

e. ____________________

10. What is the function of the malpighian tubules? ____________________

____

11. List several arthropods that are considered to be beneficial to man.

____

____

____

12. On what bases can insects be classified to order? ____________________

____

VENOMOUS ANIMALS

OBJECTIVE

Upon completion of this workbook, you can identify the various venomous animals, their method of introduction of venoms, the modes of action of their venoms, and their control measures.

1. List and describe the modes of action of animal venoms.

a. ____________________

____

b. ____________________

____

c. ____________________

____

d. ____________________

____

e. ____________________

____

2. List and describe the methods by which venoms are introduced into man.

a. ____________________

b. ____________________

c. ____________________

d. ____________________

3. List some arthropods responsible for envenomization and the orders to which they belong. ____________________

____

____

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4. Describe the method of introduction of venom and the modes of action of the venom for the following arthropods.

a. Bees ______

b: Spiders ______

c. Wasps ______

d. Yellow jackets ______

e. Hornets ______

f. Scorpions ______

g. Ants ______

h. Ticks ______

5. List the venomous reptiles native to the United States.

______

______

______

6. Describe the method of introduction of venom and the modes of action of the venom for the following reptiles.

a. Coral snake ______

b. Copperhead ______

c. Water Moccasin ______

d. Rattlesnake ______

e. Gila Monster ______

7. Describe the precautions to be taken to avoid envenomization by venomous animals.

______

______

______

______

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8. Describe the first aid procedures for the following types of envenomization.

a. Stinging insects ____________________

____

____

____

b. Black Widow spider bite ____________________

____

____

____

c. Contact caterpillars ____________________

____

____

____

9. Describe the procedures involved in the use of a snake bite kit.

____

____

____

____

____

10. Explain the control measures that can be taken to control venomous animals.

____

____

____

____

____

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BIOLOGY, IDENTIFICATION, AND CONTROL OF MOSQUITOES

OBJECTIVE

Upon completion of this workbook, you will be able to identify the various mosquitoes of medical importance and also the various control measures for each of these mosquitoes.

1. Mosquitoes are identified as a member of:

   a. Class ______________________

   b. Order ______________________

2. Describe the life cycle of mosquitoes and give the stages.

   ____

   ____

3. The three most important genera of mosquitoes from a standpoint of disease vectors are:

   a. ______________________

   b. ______________________

   c. ______________________

4. List five important diseases and their causative agents that are vectored by mosquitoes.

   a. ____

   b. ____

   c. ____

   d. ____

   e. ____

5. For what reasons are mosquito surveys essential to a control program?

   ____

   ____

   ____

   ____

6. **Describe in detail the techniques involved in a survey for mosquito larva.**

7. **Describe the methods of surveying for adult mosquitoes.**

8. **List the identifying and distinguishing characteristics of the three medically important genera of mosquitoes by stage of development.**

   a. **Egg**

   b. **Larva**

   c. **Pupa**

   d. **Adult**

9. In what types of breeding areas might the following mosquitoes be found?

a. Aedes

b. Anopheles

c. Culex

10. Describe the types of chemical controls available for mosquitoes.

11. What is the most permanent type of control measure that can be taken for mosquitoes and explain why.

12. Describe the various methods of specimen collection used for mosquitoes.

13. Which method is most efficient for the collection of most mosquito species? Why?

14. When using this "most efficient method" of collection, which specimens are counted to determine relative abundance and why these?

BIOLOGY, IDENTIFICATION, AND CONTROL OF FLIES

OBJECTIVE

Upon completion of this workbook, you will be able to identify various flies and the control measures for each species.

1. Flies are identified as members of:

   a. ____________________

   b. ____________________

2. Describe the flies life cycle by listing the stages of development.

   a. ____________________

   b. ____________________

   c. ____________________

   d. ____________________

3. What is a haltere and what is it used for?

   ____

   ____

   ____

4. Describe the life habits of the following flies:

   a. House fly ____________________

   ____

   ____

   ____

   ____

   ____

b. **Flesh fly** __________

c. **Green bottle fly** __________

d. **Black blow fly** __________

e. **Stable fly** __________

f. **Primary screw worm fly** __________

g. **Robber fly** __________

5. **What type of transmission is involved with the filth flies?**

____

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6. List the major diseases carried by filth flies and their causative agents.

a. ______

b. ______

c. ______

d. ______

e. ______

f. ______

7. What type of transmission is involved with the blood feeding flies?

______

8. List the major diseases carried by the blood feeding flies and their causative agents.

a. ______

b. ______

c. ______

d. ______

e. ______

f. ______

9. List and describe the various types of fly surveys.

______

______

______

______

______

______

______

10. What is the best preventative control for flies? Why?

11. List the types of chemical controls available for adult flies.

a.

b.

c.

d.

e.

12. Why is larval control not often used?

13. List and describe the remaining types of fly control.

14. Describe the various types of collection methods used for flies.

15. What types of baits are most acceptable for filth flies?

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BIOLOGY, IDENTIFICATION, AND CONTROL OF ECTOPARASITES

OBJECTIVE

Upon completion of this workbook, you will be able to identify the various ectoparasites of medical importance and give the control measures for each group.

FLEAS

1. The classification of fleas is as follows:

   a. Class ______________________

   b. Order ______________________

2. Describe the life cycle of fleas.

   ____

   ____

   ____

   ____

3. By what method do fleas transmit disease organisms?

   ____

   ____

4. How can you distinguish between a male and female flea?

   ____

   ____

5. List the host, disease or diseases caused, and the pathogentic agent involved with the following fleas.

   a. Human flea ______________________________________

   ____

   b. Dog flea ______________________________________

   ____

c. Cat flea

d. Northern rat flea

e. Oriental rat flea

f. Sticktight flea

g. Chigoe flea

6. List and describe the control measures for fleas.

7. Describe the methods of specimen collection used for fleas.

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LICE

1. The classification of lice is as follows:

   a. Class ______________________

   b. Order ______________________

2. Describe the life cycle of lice.

3. By what methods do lice transmit disease organisms?

4. How can you distinguish between head lice and crab lice?

5. Describe the feeding habits of head lice.

6. Describe the feeding habits of body lice.

7. Describe the feeding habits of crab lice.

8. List the host, disease or diseases caused, and the pathogenic agent involved with the following lice:

a. Crab louse

b. Head louse

c. Body louse

9. List and describe the control measures for lice.

10. Describe the methods of specimen collection used for lice.

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TICKS

1. The classification of ticks is as follows:

   a. Class ______

   b. Order ______

2. Describe the life cycle of ticks.

______

______

______

______

3. By what method do ticks transmit disease organisms?

______

______

4. How can you distinguish between a male hard tick and a female hard tick?

______

______

5. List the host, disease or diseases caused, and the pathogentic agent involved with the following ticks:

   a. Rocky mountain spotted fever tick ______

   ______

   b. American dog tick (wood tick) ______

   ______

   c. Brown dog tick ______

   ______

   d. Lone-star tick ______

   ______

   e. Foul tick ______

   ______

f. Gulf coast tick ______________________________

____

g. Ear tick ______________________________

____

6. Explain the importance of ticks as economic pests.

____

____

____

7. Give the family and list the identifying characteristics of the hard tick.

____

____

____

8. Give the family and list the identifying characteristics of the soft tick.

____

____

____

9. List and describe the control measures for ticks.

____

____

____

____

____

____

____

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10. Describe the methods of specimen collection used for ticks.

______

______

______

______

______

______

MITES

1. The classification of mites is as follows:

   a. Class ______

   b. Order ______

2. Describe the life cycle of mites.

______

______

______

______

3. By what method do mites transmit disease organisms?

______

______

4. List the host, disease or diseases caused, and the pathogenic agent involved with the following mites:

   a. Itch mite ______

   ______

   b. Mange mite ______

   ______

   c. Scabies mite ______

   ______

d. Chigger

5. In what ways are mites economically important?

6. Describe the life habit and discuss the importance of clover mites.

7. List and describe the control measures for mites.

8. Describe the methods of specimen collection used for mites.

Make a complete list of the diseases transmitted by the ectoparasites studied in this course.

VECTOR	HOST	PATHOGEN	DISEASE

BIOLOGY, IDENTIFICATION, AND CONTROL OF DOMESTIC RODENTS

OBJECTIVE

Upon completion of this workbook, you will be able to identify domestic rodents, select and safely handle rodenticides, and properly set the correct type traps for various rodent species.

1. List the three most important domestic rodents from a medical and economic standpoint.

   a. ______________________

   b. ______________________

   c. ______________________

2. How can domestic rodents be distinguished from field rodents?

   ____

   ____

3. List the identifying characteristics of the Norway rat.

   ____

   ____

   ____

4. List the identifying characteristics of the Roof rat.

   ____

   ____

   ____

5. List the identifying characteristics of the House mouse.

   ____

   ____

   ____

6. Describe the life cycle and habits of the following domestic rodents:

   a. Norway rat ____________________

   b. Roof rat ____________________

   c. House mouse ____________________

7. List five ways in which domestic rodents are considered to be of economic importance.

8. List the diseases for which rodents are either the primary reservoirs or the direct vectors themselves. Also list the causative agent and the Arthropod vector, if there is one involved in the disease transmission cycle.

   a. ____________________

   b. ____________________

c. ____________________

d. ____________________

e. ____________________

f. ____________________

g. ____________________

h. ____________________

i. ____________________

j. ____________________

k. ____________________

l. ____________________

m. ____________________

n. ____________________

9. List the signs of infestation that may give evidence to domestic rodent activity.

10. List the potential harborage areas for domestic rodents.

11. List the steps in a rodent control program under normal conditions.

a. ____________________

b. ____________________

c. ____________________

d. ____________________

e. ____________________

f. ____________________

12. List the steps in a rodent control situation under disease conditions.

    a. ____________________

    b. ____________________

    c. ____________________

    d. ____________________

    e. ____________________

    f. ____________________

13. Describe the two main types of rodenticides.

    a. Anticoagulant (multiple dose) ____________________

    b. One-shot (single dose) ____________________

14. What is an emetic?

15. List the main advantage of using anticoagulants in a rodent control situation.

16. Folling is a list of commonly used rodenticides. Describe in detail the uses for and the characteristics of each rodenticide.

    a. Warfarin ____________________

b. Pival ____________________

c. Fumarin ____________________

d. Red Squill ____________________

e. Antu ____________________

f. 1080 ____________________

g. Zinc Phosphide ____________________

h. Strychnine ____________________

i. Thallium Sulfate ____________________

j. Arsenic Trioxide

k. McN-1025

l. Yellow Phosphorus

m. Calcium Cyanide

17. What is a torpedo?

18. List the components of a poison bait for domestic rodents.

19. How would you go about determining which of several bait materials was preferred by a certain species of domestic rodent?

20. Describe the bait preferences for Norway and Roof rats.

21. What must be eliminated from the area when using water baits?

Why?

22. What must be done with all leftover poisons and dead rats?

23. Describe the types of traps available for rodent control.

24. In what cases can or should traps be used for domestic rodents?

25. Describe how to set a cage trap.

26. What is the primary use for cage traps?

27. **How might trap shyness be prevented when using unbaited traps?**

28. **Describe the procedure used to determine if rodents are by-passing the traps placed in their runs.**

29. **List the safety precautions to be observed when using poison baits.**

BIOLOGY, IDENTIFICATION, AND CONTROL OF FIELD RODENTS AND OTHER VERTEBRATES

OBJECTIVE

Upon completion of this workbook, you will be able to identify the medically and economically important field rodents, other important vertebrates, the diseases they are associated with, and the controls for the various rodents and important vertebrates.

1. List several medically and economically important field rodents.

____

____

____

____

2. List the major diseases for which field rodents serve as possible reservoirs and the causative agent of each.

a. ____________________

b. ____________________

c. ____________________

d. ____________________

e. ____________________

f. ____________________

g. ____________________

3. Describe the conditions under which field rodents may be responsible for producing epidemics of rodent diseases in humans.

____

____

____

____

4. Describe the types of trapping programs that can be used in field rodent control.

5. What is the most important use of live trapping?

6. List the other important vertebrates and describe the importance of each.

7. Describe the control procedures for these vertebrates.

8. What precautions must be taken when handling field rodents?

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LESSON PLAN (Part I, General)

APPROVAL OFFICE AND DATE TCETC 17 JUN 1975	INSTRUCTOR
COURSE NUMBER 3ABR56630	COURSE TITLE Entomology Specialist
BLOCK NUMBER III	BLOCK TITLE Control of Economically Important Pests

LESSON TITLE
Fumigation Techniques (Day 21)

LESSON DURATION

CLASSROOM/Laboratory	Complementary	TOTAL
6 Hrs	2 Hrs	8 Hrs

POI REFERENCE

PAGE NUMBER	PAGE DATE	PARAGRAPH
30	15 May 1975	1

STS/CTS REFERENCE

NUMBER	DATE
STS 566X0	7 November 1974

SUPERVISOR APPROVAL

SIGNATURE	DATE	SIGNATURE	DATE

PRECLASS PREPARATION

EQUIPMENT LOCATED IN LABORATORY	EQUIPMENT FROM SUPPLY	CLASSIFIED MATERIAL	GRAPHIC AIDS AND UNCLASSIFIED MATERIAL
Portable Fumigation Kit Foot Pump Dusters Safety equipment Air sampling and Testing equipment	None	None	Training Film: The Enemy Within SG 3ABR56630 III-1 WB 3ABR56630 III-1P1 AFM 91-16 CDC, Insecticides for the Control of Insects of Public Health Importance. AFPCP TIM NO 11

CRITERION OBJECTIVES AND TEACHING STEPS

1a. Research references provided and correctly list the characteristics of fumigants:

(1) Definition of Fumigant
(2) Forms in which fumigants are purchased
(3) Advantages verses disadvantages
(4) Action of fumigants
(5) Common types of fumigants

1b. Using references provided, research and correctly list the precautions to be observed in handling fumigants.

(1) Posting off limits and warning signs
(2) Protective equipment
(3) Protective measures for goods and materials
(4) Notification of proper authorities

202B

LESSON PLAN (Part I, General) CONTINUATION SHEET

CRITERION OBJECTIVES AND TEACHING STEPS (Continued)

1c. Given fumigation equipment, safety equipment, and under the guidance of instructors, perform a fumigation operation in a real or simulated situation in accordance with Air Force regulations and directives.

(1) Portable fumigation kits
(2) Foot pump dusters

LESSON PLAN (Part I, General)

APPROVAL OFFICE AND DATE TCETC 17 JUN 1975	INSTRUCTOR
COURSE NUMBER 3ABR56630	COURSE TITLE Entomology Specialist
BLOCK NUMBER III	BLOCK TITLE Control of Economically Important Pests

LESSON TITLE
Stored Products Pests (Day 22)

LESSON DURATION

CLASSROOM/Laboratory 6 Hrs	Complementary 2 Hrs	TOTAL 8 Hrs

POI REFERENCE

PAGE NUMBER 31	PAGE DATE 15 May 1975	PARAGRAPH 2

STS/CTS REFERENCE

NUMBER STS 566X0	DATE 7 November 1974

SUPERVISOR APPROVAL

SIGNATURE	DATE	SIGNATURE	DATE

PRECLASS PREPARATION

EQUIPMENT LOCATED IN LABORATORY	EQUIPMENT FROM SUPPLY	CLASSIFIED MATERIAL	GRAPHIC AIDS AND UNCLASSIFIED MATERIAL
Pest specimens, stored products pests Microscopes Pesticide dispersal equipment Dispenser, Insecticide (Dichlorvos Vapor) (over)	Truck, stake and platform, 1½ ton	None	SG 3ABR56630-III-2 WB 3ABR56630-III-2-Pl AFM 91-16 CDC Manuals: Household and Stored Food Pest Key to Stored Pests Instruction Manuals, Dispersal Equipment

CRITERION OBJECTIVES AND TEACHING STEPS

2a. Using furnished reference materials correctly name the important fabric-destroying pests and describe damage caused by each

2b. Using furnished reference materials, correctly describe the biological factors of selected stored fabric pests that must be considered in selecting and planning control measures.

(1) Life cycle
(2) Habitat
(3) Behavior

2c. Using furnished reference materials, correctly list the measures for controlling fabric pests

(1) Prevention
(2) Survey-Collection techniques
(3) Environmental controls

LESSON PLAN (Part I, General) CONTINUATION SHEET

CRITERION OBJECTIVES AND TEACHING STEPS (Continued)

PRECLASS PREPARATION

EQUIPMENT LOCATED IN LABORATORY	GRAPHIC AIDS AND UNCLASSIFIED MATERIAL
Micron Generation Unit (ULV), Hand Carried Portable fumigation kit Air sampling and testing equipment	Training Film: FN 9998A

(4) Sanitation
(5) Chemical controls

2d. Using furnished reference materials, correctly name the important pests of stored food products and describe damage caused by each

(1) Beetles
(2) Moths
(3) Mites

2e. Using furnished reference materials, describe the biological factors of selected stored food pest that must be considered in selecting and planning control measures

(1) Life cycle
(2) Habitat
(3) Behavior

2f. Using reference materials furnished, correctly list the measures for controlling stored food pests.

(1) Prevention
(2) Survey-Collection techniques
(3) Environmental controls
(4) Sanitation
(5) Chemical controls

2g. Using identification keys and technical data, identify by correctly matching selected specimens of stored products pests to keys

2h. Using equipment provided, perform control procedures in accordance with AFM 91-16, for stored products pests.

(1) Survey-collection
(2) Residual spraying
(3) Fumigation

LESSON PLAN (Part I, General)

APPROVAL OFFICE AND DATE TCETC 17 JUN 1975	**INSTRUCTOR**
COURSE NUMBER 3ABR56630	**COURSE TITLE** Entomology Specialist
BLOCK NUMBER III	**BLOCK TITLE** Control of Economically Important Pests

LESSON TITLE
Household Pests (Days 23 and 24)

LESSON DURATION

CLASSROOM/Laboratory	Complementary	TOTAL
8 Hrs	2 Hrs	10 Hrs

POI REFERENCE

PAGE NUMBER	PAGE DATE	PARAGRAPH
33	15 May 1975	3

STS/CTS REFERENCE

NUMBER	DATE
STS 566X0	7 November 1974

SUPERVISOR APPROVAL

SIGNATURE	DATE	SIGNATURE	DATE

PRECLASS PREPARATION

EQUIPMENT LOCATED IN LABORATORY	EQUIPMENT FROM SUPPLY	CLASSIFIED MATERIAL	GRAPHIC AIDS AND UNCLASSIFIED MATERIAL
Microscopes Hand sprayers Power sprayers Power dusters Household Pest Specimens	Truck, Stake and platform, 1½ ton		SG 3ABR56630-III-3 WB 3ABR56630-III-3-P AFM 91-16 CDC Manual, Househol and Stored Food Insects Identification Keys

CRITERION OBJECTIVES AND TEACHING STEPS

3a. Using furnished reference materials, name the important household pests and list those characteristics of each that causes it to be placed in this classification

3b. Using provided reference materials, describe the biological factors of selected household pests that must be considered in selecting and planning controls

(1) Life cycle
(2) Habitat
(3) Behavior

3c. Using provided reference materials, list the measures for controlling household pests

(1) Sanitation
(2) Mechanical controls
(3) Chemical controls

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LESSON PLAN (Part I, General) CONTINUATION SHEET

CRITERION OBJECTIVES AND TEACHING STEPS (Continued)

3d. Using identification keys and specimens provided, identify by matching selected species to keys

7e. Using selected equipment and technical guidance, perform control procedures for household pests in a real or simulated control situation

(1) Survey/collection
(2) Residual spraying or dusting

LESSON PLAN (Part I, General)

APPROVAL OFFICE AND DATE TCETC 17 JUN 1975	INSTRUCTOR
COURSE NUMBER 3ABR56630	COURSE TITLE Entomology Specialist
BLOCK NUMBER III	BLOCK TITLE Control of Economically Important Pests

LESSON TITLE
Fumigation Clearance Techniques (Day 24)

LESSON DURATION

CLASSROOM/Laboratory 4 Hrs	Complementary 2 Hrs	TOTAL 6 Hrs

POI REFERENCE

PAGE NUMBER 35	PAGE DATE 15 May 1975	PARAGRAPH 4

STS/CTS REFERENCE

NUMBER STS 566X0	DATE 7 November 1974

SUPERVISOR APPROVAL

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PRECLASS PREPARATION

EQUIPMENT LOCATED IN LABORATORY	EQUIPMENT FROM SUPPLY	CLASSIFIED MATERIAL	GRAPHIC AIDS AND UNCLASSIFIED MATERIAL
Portable fumigation kit Safety equipment Air sampling and testing equipment	None	None	SG 3ABR56630-III-4 WB 3ABR56630-III-4-P1 AFM 91-16 AFPCB TIM #11

CRITERION OBJECTIVES AND TEACHING STEPS

4a. Using technical information provided, list and describe clearance procedures required for fumigation

(1) In transit clearing
(2) In place clearing

4b. Given technical guidance and equipment, perform clearance procedures in a real or similated operation in accordance with Air Force directives

(1) Testing procedures
(2) Removal of cover procedures

ATC FORM AUG 73 770

LESSON PLAN (Part I, General)

APPROVAL OFFICE AND DATE ETC 1 7 JUN 1975	**INSTRUCTOR**
COURSE NUMBER 3ABR56630	**COURSE TITLE** Entomology Specialist
BLOCK NUMBER III	**BLOCK TITLE** Control of Economically Important Pests

LESSON TITLE
Structural Pests (Days 25 and 26)

LESSON DURATION

CLASSROOM/Laboratory 12 Hrs	Complementary 2 Hrs	**TOTAL** 14 Hrs

POI REFERENCE

PAGE NUMBER 36	**PAGE DATE** 15 May 1975	**PARAGRAPH** 5

STS/CTS REFERENCE

NUMBER STS 566X0	**DATE** 7 November 1974

SUPERVISOR APPROVAL

SIGNATURE	DATE	SIGNATURE	DATE

PRECLASS PREPARATION

EQUIPMENT LOCATED IN LABORATORY	EQUIPMENT FROM SUPPLY	CLASSIFIED MATERIAL	GRAPHIC AIDS AND UNCLASSIFIED MATERIAL
Pest Specimen set, structural pests icroscopes robing tools ubslab Injector ydraulic sprayer oto hammer	Truck, stake & platform, 1½ ton	None	SG 3ABR56630-III-5 WB 3ABR56630-III-5-P1 WB 3ABR56630-III-5-P2 AFM 91-16 Instruction Manuals Training Films: MN8167A, MN8167B FLC 12-0100

CRITERION OBJECTIVES AND TEACHING STEPS

a. Using reference data provided, name and describe the important structural pests and damage caused by each.

(1) Termites
(2) Wood boring beetles
(3) Fungi

b. Using provided data, list and describe the biological factors of selected structural pests that must be considered when selecting and planning controls.

(1) Life cycle
(2) Habitat
(3) Behavior

. Using the reference materials provided, list the measures for controlling structural pests.

LESSON PLAN (Part I, General) CONTINUATION SHEET

CRITERION OBJECTIVES AND TEACHING STEPS (Continued)

(1) Sanitation
(2) Construction techniques
(3) Mechanical controls
(4) Chemical controls

5d. Using identification keys and specimens, identify by matching selected specimens to keys.

5e. Using equipment and technical guidance, perform procedures for controlling structural pests.

(1) Inspection
(2) Coordination with other CE Shops
(3) Surface application of residual sprays
(4) Preslab soil poisoning
(5) Subslab injection
(6) Trench treatment

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LESSON PLAN (Part I, General)

APPROVAL OFFICE AND DATE TCETC 17 JUN 1975	INSTRUCTOR
URSE NUMBER ABR56630	COURSE TITLE Entomology Specialist
BLOCK NUMBER III	BLOCK TITLE Control of Economically Important Pests

LESSON TITLE
Horticultural Pests (Day 27)

LESSON DURATION

CLASSROOM/Laboratory	Complementary	TOTAL
6 Hrs		6 Hrs

POI REFERENCE

PAGE NUMBER	PAGE DATE	PARAGRAPH
37	15 May 1975	6

STS/CTS REFERENCE

NUMBER	DATE
STS 566X0	7 November 1974

SUPERVISOR APPROVAL

SIGNATURE	DATE	SIGNATURE	DATE

PRECLASS PREPARATION

EQUIPMENT LOCATED IN LABORATORY	EQUIPMENT FROM SUPPLY	CLASSIFIED MATERIAL	GRAPHIC AIDS AND UNCLASSIFIED MATERIAL
ad sprayers Dusters Hydraulic sprayer, Trailer Mounted Granular spreader Horticultural Pest Specimens	Truck, stake and Platform, 1½ ton		SG 3ABR56630-III-6 WB 3ABR56630-III-6-P1 AFM 91-16 Instruction Manuals, Dispersal Equipment TF5747

CRITERION OBJECTIVES AND TEACHING STEPS

6a. Using provided reference materials, name the important horticultural pests and describe the damage caused by each

6b. Using the reference material furnished, describe the biological factors of selected horicultural pests that must be considered when selecting and planning control measures.

(1) Life cycle
(2) Habitat
(3) Behavior

6c. Using reference materials provided, record the measures for controlling selected horticultural pests.

(1) Survey-collection techniques
(2) Prevention
(3) Chemical controls

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LESSON PLAN (Part I, General) CONTINUATION SHEET

CRITERION OBJECTIVES AND TEACHING STEPS (Continued)

6d. Using identification keys and specimens provided, identify by matching selected species of horicultural pests to keys.

6e. Using equipment and technical guidance, perform procedures for controlling horticultural pests.

(1) Survey - collection
(2) Chemical controls

LESSON PLAN (Part I, General)

APPROVAL OFFICE AND DATE TCETC 26 SEP 1973	INSTRUCTOR
COURSE NUMBER 3ABR56630	COURSE TITLE Entomology Specialist
BLOCK NUMBER III	BLOCK TITLE Control of Economically Important Pests

LESSON TITLE
Vegetation Control

LESSON DURATION

CLASSROOM/LABORATORY	COMPLEMENTARY	TOTAL
6 hrs	0	6 hrs

POI REFERENCE

PAGE NUMBER	PAGE DATE	PARAGRAPH
33	1 August 1973	7

STS/CTS REFERENCE

NUMBER	DATE
STS 566X0	3 March 1970

SUPERVISOR APPROVAL

SIGNATURE	DATE	SIGNATURE	DATE

PRECLASS PREPARATION

EQUIPMENT LOCATED IN LABORATORY	EQUIPMENT FROM SUPPLY	CLASSIFIED MATERIAL	GRAPHIC AIDS AND UNCLASSIFIED MATERIAL
Compressed Air Sprayer Safety Equipment Granular Spreader Trailer Mounted Hydraulic Sprayer	Truck, stake and platform, 1½ ton		Slide set, vegetation Control Identification Keys Sample Herbicide labels AFM 91-19, Herbicide Manual SG 3ABR56650-III-7

CRITERION OBJECTIVES AND TEACHING STEPS

7.a. Using identification keys and technical data provided collect and identify pest vegetation species.

- (1) Physical collection
- (2) Determination of Growth Habits
- (3) Identification

b. Using reference materials provided, classify and state the use of selected herbicides.

- (1) General uses of herbicides
- (2) Modes of action
- (3) Chemical, physical and biological properties of selected herbicides
- (4) Harmful effects of careless handling

c. Using technical references provided, describe the procedures for selecting, applying and evaluating a vegetation control program.

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LESSON PLAN (Part I, General) CONTINUATION SHEET

CRITERION OBJECTIVES AND TEACHING STEPS (Continued)

Preclass Preparation (Cont'd)

Graphic Aids
WB 3ABR56630-III-7-P1
Instruction Manual
Dispersal Equipment
Commercial Text: Common
Weeds of U.S.

(1) Factors that aid in selection of herbicides
(2) Procedures for formulating & mixing
(3) Procedures for applying
(4) Follow up and evaluation procedures

d. Given technical guidance and equipment, perform vegetation control on a selected problem area.

(1) Selection of proper herbicide
(2) Selection of proper equipment
(3) Calculation of necessary amount
(4) Mixing and applying
(5) Cleaning and maintaining equipment

STUDY GUIDES 3ABR56630-III-1 thru -11

Department of Civil Engineering Training

Entomology Specialist

CONTROL OF ECONOMICALLY IMPORTANT PESTS

July 1975

SHEPPARD AIR FORCE BASE

Designed For ATC Course Use

DO NOT USE ON THE JOB

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Note: Numbers III-8 thru III-11 have been omitted because of military specific materials.

This supersedes SGs 3ABR56630-III-1 thru -11, September 1973
Copies of superseded material may be used until supply is exhausted.

Dept of Civil Engineering Tng
Sheppard AFB, Texas

SG 3ABR56630-III-1
July 1975

FUMIGATION TECHNIQUES

Day 21

OBJECTIVE

Upon completion of this study guide, you will be able to state the techniques of fumigation and the hazards concerned with fumigation operations.

INTRODUCTION

With proper training and facilities, fumigation can be an effective tool in the control of several varieties of pests. This lesson is not designed to provide complete information concerning fumigation, but as an introduction to the techniques and hazards involved. The student should seek further training before attempting fumigation at his home installation.

STUDY ASSIGNMENT

1. AFM 91-16, Chapter 2, Section 2, and Chapter 3, Section 3.
2. AFPCB TIM 11, Hydrogen Phosphide Fumigation with Aluminum Phosphide
3. CDC (Center for Disease Control): Insecticides for the Control of Insects of Public Health Importance

QUESTIONS

1. Define fumigant.
2. Describe the action of fumigants.
3. List the precautions to be observed before, during, and after fumigation.
4. List the types of equipment used with fumigating operations.
5. List two purposes for which aluminum phosphide is used.

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SG 3ABR56630-III-2
July 1975

STORED PRODUCTS PESTS

Day 22

OBJECTIVE

Upon completion of this study guide assignment, you will be able to identify stored products pests. You will also understand the proper control measures for stored food and stored fabric insects.

INTRODUCTION

The principles involved with the control of stored products pests are important to the entomologist. These principles will enable you to correctly identify the pest of concern and the damage it causes. This information, coupled with the knowledge of proper control procedures, will enable you to deal with the most commonly encountered stored products pests in a safe, correct and professional manner.

STUDY ASSIGNMENT

The following reading list is designed to enable you to meet the objectives of the day's lesson.

1. AFM 91-16, Chapter 7, Section 9
2. CDC, Household and Stored Food Insects of Public Health Importance and their Control

QUESTIONS

1. Name two orders of insects that include most of our stored products pests.
2. Which pest is considered to be the most destructive of the stored products pests?

HOUSEHOLD PESTS

Days 23 and 24

OBJECTIVE

When finished with this study guide assignment, you will be able to combine the pertinent bionomic factors with coordinated information from other agencies to control the most important household pests.

INTRODUCTION

The control of household pests is of much economic importance. This lesson will enable you to understand the proper techniques used in controlling household pests. Each entomologist has the responsibility to use these techniques in implementing a safe and effective control program.

STUDY ASSIGNMENT

1. AFM 91-16, Chapter 7, Sections 4, 7, and 8
2. CDC, Household and Stored Food Insects of Public Health Importance and their Control

QUESTIONS

1. List four important species of cockroaches.
2. Name the cockroach that is often observed with an attached ootheca.
3. To what order of insects do silverfish belong?
4. Which fumigant is commonly used to prevent infestations of the casemaking clothes moth in homes?
5. List two methods of controlling cockroaches.

FUMIGATION CLEARANCE TECHNIQUES

Day 24

OBJECTIVE

When finished with this lesson, you will be able to list and perform clearance procedures in accordance with Air Force directives.

INTRODUCTION

This lesson primarily concerns clearance techniques for aluminum phosphide fumigation but clearance techniques for methyl bromide fumigation will be discussed. Check-lists will be utilized in performing clearance procedures for aluminum phosphide fumigation.

STUDY ASSIGNMENT

1. AFM 91-16, Chapter 3, Section 3
2. AFPCB TIM #11, Hydrogen Phosphide Fumigation with Aluminum Phosphide, pages 7 and 13.

QUESTIONS

1. What is the first step required in clearing a stack under fumigation?
2. At what PH_3 concentration is it safe for personnel to re-enter the building?
3. When must a gas mask be worn when clearing a boxcar under hydrogen phosphide fumigation?
4. At the end of fumigation period, what concentration of hydrogen phosphide gas must be present under the stack to produce effective insect control?

SG 3ABR56630-III-5
July 1975

STRUCTURAL PESTS

Days 25 and 26

OBJECTIVE

Upon completion of this study guide assignment, you will be able to use bionomic principles necessary for identification of structural pests and to apply these principles to damage assessment and control of structural pests.

INTRODUCTION

The principles of this lesson are important to the entomologist in that he will be able to assess damage caused by structural pests in terms of safety, security, and economy; and determine the pest present without having a specimen for identification. This lesson does include, however, identification of most common structural pests. When the primary tasks have been completed, the pest controller will be able to use the third part of this lesson to determine the specific control measures necessary.

STUDY ASSIGNMENT

AFM 91-16, Chapter 8, Sections 1, 2, 3 and 5

QUESTIONS

1. Describe the caste system found in termites.

2. List the identifying characteristics of each caste.

3. List some of the materials that termites may attack.

4. Define fungus.

5. Describe several methods of wood preservation.

6. Which of all of the structural pests is the most damaging?

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SG 3ABR56630-III-6
July 1975

HORTICULTURAL PESTS

Day 27

OBJECTIVE

The completion of the study assignment in this study guide will enable the student to use bionomic principles in the identification and control of horticultural pests.

INTRODUCTION

The control of horticultural pests is important to the entomologist. An understanding of the principles of controlling horticultural pests will enable the student to effectively control those pests within the sphere of Air Force necessity.

STUDY ASSIGNMENT

AFM 91-16, Chapter 7, Section 10

QUESTIONS

1. In what area of the United States is Japanese beetle damage most evident?

2. Damage to trees by bagworms is done in which stage of the life cycle?

3. What is the relationship between ants and aphids similar to?

SG 3ABR56630-III-7
July 1975

VEGETATION CONTROL

Day 28

OBJECTIVE

Upon completion of this study guide assignment, you will be able to recognize the importance of pest vegetation and to state the pertinent facts about identification. You will also be able to understand the use of a wide variety of herbicides and be able to initiate and effectively evaluate a vegetation control program.

INTRODUCTION

A knowledge of the importance of pest vegetation and its control will enable the entomologist to understand the purpose of such control. The control of pest vegetation is important for safety, beautification, and as a general nuisance. This information will enable you to accomplish control of pest vegetation quickly, safely, and economically.

STUDY ASSIGNMENT

AFM 91-19, Sections 1 and 2

QUESTIONS

1. Define a weed.
2. How do weeds reproduce?
3. What is the purpose of a weed collection?
4. List and describe two general uses of herbicides.
5. What determines the need for follow-up herbicide applications?

WORKBOOKS 3ABR56630-III-1-P1 thru 11-P1

Department of Civil Engineering Training

Entomology Specialist

CONTROL OF ECONOMICALLY IMPORTANT PESTS

17 September 1973

SHEPPARD AIR FORCE BASE

Designed For ATC Course Use

DO NOT USE ON THE JOB

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This supersedes WBs 3ABR56630-III-1-P1 thru 9-P1, 11 January 1973

Dept of Civil Engineering Training
Sheppard AFB, Texas

WB 3ABR56630-III-1-P1
17 September 1973

FUMIGATION TECHNIQUES

OBJECTIVE

Upon completion of this workbook, you will be able to identify the various types of fumigants, fumigation equipment, and fumigation procedures.

PART I

1. Define fumigant: ______________________________

____

2. An advantage of fumigants is ______________________________

____

3. List the two fumigants most commonly used for large scale operations.

a. ____________________

b. ____________________

4. The substance added to methly bromide as a warning agent is ____________.

5. List 4 solid fumigants available for use in the military.

a. ____________________

b. ____________________

c. ____________________

d. ____________________

6. The instructor will assign you a predetermined area and using aluminum phosphide, will advise you what type of fumigation operation to perform. Prepare commodities for fumigation using applicable sections of the aluminum phosphide preparation checklist.

ALUMINUM PHOSPHIDE FUMIGATION-PREPARATION CHECKLIST

1. FACILITY: ____________________ DATE AND TIME: ____________________

2. FUMIGATION TEAM: (MINIMUM OF 2)

a. ____________________

b. ____________________

3. **LOCATION:**

a. Indoors - Bldg. # ____________ Section ____________

b. Outdoors - Nearest bldg. # ____________

(1) Hardstand ____________

(2) Ground ____________

c. Railcar location ____

(1) In-transit ______________ Destination ____________________________

(2) In-place ______________

4. **NOTIFICATION:**

	PERSON NOTIFIED	PHONE NUMBER	TIME/DATE NOTIFIED
a. Fire			
b. Security			
c. Medical			
d. Safety			
e. OIC			

Installation engineer ____________

Public Work Officer ____________

Base Civil Engineer ____________

5. **COMMODITY TO BE FUMIGATED:**

a. Nomenclature ______________________________

b. FSN (if applicable) ______________________________

c. Contract number ______________________________

d. Contract item number ______________________________

e. Manufacturer or assembler ______________________________

f. Lot number and date of pack ______________________

g. Quantity ______________________

(1) Weight ____________ lbs.

(2) Cubic feet

(a) of stack ____________

(b) of railcar ____________

h. Item (does) (does not) contain copper, gold, silver, nor is it an explosive or ammunition.

6. EQUIPMENT (ARE THE FOLLOWING ITEMS ON HAND?):

		YES	NO
a.	2 mil 4 mil 6 mil polyethylene	____	____
b.	4 mil plastic and 4 inch masking tapes	____	____
c.	Measuring tape	____	____
d.	Thermometer	____	____
e.	Two approved gas masks	____	____
f.	Two unexpired gas mask canisters	____	____
g.	Aluminum pan or tray (in-place stacks)	____	____
h.	Envelopes (railcars)	____	____
i.	Warning signs	____	____
j.	Surgical gloves	____	____
k.	Measuring device (cup with premeasured volume for tablets or pellets)	____	____
l.	Auer test tubes with sampling bulb	____	____
m.	Drager test tubes with bellows pump	____	____
n.	Sand snakes or loose sand	____	____
o.	Bucket	____	____

		YES	NO
p.	Liquid detergent	______	______
q.	Flashlight	______	______
r.	Aluminum Phosphide (tablets) (pellets)	______	______

7. DOSAGE REQUIREMENT (NUMBER OF TABLETS OR PELLETS USED)

a. Indoor stack: ______________________________
(20 tablets or 100 pellets/1000 cubic feet)

b. Outdoor stack: ______________________________
(33 tablets or 165 pellets/1000 cubic feet)

c. Railcar: ______________________________
(50 tablets or 165 pellets/1000 cubic feet)

8. FUMIGATION PROCEDURES:

a. In-place stack fumigation

		YES	NO
(1)	Has an aluminum phosphide fumigation checklist been completed?	______	______
(2)	Product temperature exceeds 40 degrees F.	______	______
(3)	After draping tarp, there is at least an 18" border of polyethylene floor lap on all sides.	______	______
(4)	Corners are neatly folded to allow sealing tarp to floor.	______	______
(5)	Entire tarp has been inspected for tears and repaired if necessary.	______	______
(6)	Sandsnakes overlap at least 6" and additional sandsnakes or loose sand are used at the corners.	______	______
(7)	All sharp corners are taped.	______	______
(8)	Two approved gas masks are available nearby but not in the immediate area of the fumigation.	______	______
(9)	Surgical gloves are used to handle tablets or pellets.	______	______

		YES	NO
(10)	Tablets or pellets are measured into pans or trays (in a single layer, and placed under tarp within 30 minutes after container is opened.		
(11)	Tarp securely sealed to floor or ground.		

(12) Gas concentration at: 24 hours ____________

48 hours ____________

72 hours ____________

b. Railcar fumigation:

		YES	NO
(1)	Preload inspection		
	(a) Railcar is clean and in good repair.		
	(b) All holes and open cracks in the floor, walls, or roof have been repaired or sealed. (NOTE: A polyethylene film may be used on the floor to accomplish this requirement.)		
(2)	Any tears of the polyethylene tarp which occured during loading have been repaired.		
(3)	Warning signs are attached to the middle pallet facing doors.		
(4)	Two approved gas masks are available nearby but not in the railcar.		
(5)	Surgical gloves are used to handle tablets or pellets.		
(6)	Not more than two tablets or 10 pellets are placed in each moisture permeable envelope.		
(7)	Tops of envelopes were folded over, then taped or stapled to a piece of cardboard per instructions in MIL-STD 1486A and attached to the wall adjacent to a door and at a height of 8 - 12 inches above the top of the item to be fumigated.		
(8)	Envelopes were placed so aluminum phosphide does not come in contact with the item to be fumigated.		

		YES	NO
(9)	Loading of fumigant completed and doors closed within 30 minutes after container is opened.	____	____
(10)	Doors are properly sealed and warning signs attached to the exteriors of each door.	____	____

9. SAFETY:

a. Has the fumigation team been briefed on the emergency procedures for:

		YES	NO
(1)	Deactivating a live stack?	____	____
(2)	Providing first aid in case of PH_3 poisoning?	____	____

b. Have all warehouse personnel been briefed on:

		YES	NO
(1)	Odor of gas?	____	____
(2)	What to do in case it is detected?	____	____
(3)	Providing emergency first aid in case of PH_3 poisoning?	____	____

10. REMARKS: ____

____

____

____

____

____

____

____

11. CERTIFICATION:

I CERTIFY THAT THE ABOVE INFORMATION IS CORRECT, WAS ACTUALLY PERFORMED, AND BOTH A PREPARATION AND FUMIGATION CHECKLIST WERE COMPLETED IF FUMIGATION WAS INITIATED AT THIS INSTALLATION.

____
PEST CONTROL(SUPERVISOR)
(OPERATOR)

PART II

1. What is the process by which phosphine gas is liberated from the aluminum phosphide? ______________________________

2. What purpose does the parafin serve in aluminum phosphide formulated?

3. Why is ammonium carbamate added to aluminum phosphide?

4. Why is the rapid molecular movement of phosphine beneficial in fumigation operations?

5. Why is the proper disposal of the aluminum phosphide residue remaining after completion of fumigation operations so important?

6. Why is the two man concept so important in fumigation operations?

7. What steps should be taken in case of accidental inhalation of phosphine gas?

8. During what stages of aluminum phosphide operations should rubber gloves be worn?

9. During what stages of aluminum phosphide operations should a gas mask be worn?

10. What offices should be notified prior to an aluminum phosphide fumigation operation?

CONTROL OF STORED PRODUCTS PESTS

OBJECTIVE

Upon completion of this workbook, you will be able to identify stored products pests and to choose the correct control measures for each pest.

1. The classification of mites is as follows·

   a. Class ____________________

   b. Order ____________________

2. List some of the stored products infested by Tyroglypid mites.

3. Describe the signs of infestation for Tyroglypid mites.

   a. ____________________

   b. ____________________

   c. ____________________

4. Describe the life cycle of mites.

5. Describe the control measures for mites in stored products.

6. Describe the methods of specimen collection for mites in stored products.

____

____

____

____

7. The classification of moths is as follows:

   a. Class ______________

   b. Order ______________

8. Give a general description of the larva and adult of the following stored products moths.

   a. Clothes moth - ______________

   b. Webbing Clothes moth - ______________

   c. Mediterranean Flour moth - ______________

   d. Indian Meal moth - ______________

   e. Angoumois Grain moth - ______________

9. What is characteristic about the damage of the Webbing Clothes moth?

10. List the types of stored products that are damaged by these moths.

11. Describe the life cycle of moths.

12. Describe the control measures for stored products moths.

13. List the methods of specimen collection for stored products moths.

14. The classification of beetles is as follows:

a. Class ____________________

b. Order ____________________

15. List the types of products damaged by the stored products beetles.

____

____

____

____

16. Describe the damage caused by each of the following beetles:

a. Larder beetle - ____

____

b. Black Carpet beetle - ____

____

c. Furniture Carpet beetle - ____

____

d. Granary Weevil - ____

____

e. Rice Weevil - ____

____

f. Saw-toothed Grain beetle - ____

____

g. Cigarette beetle - ____

____

h. Lesser Grain Boror - ____

____

i. Confused Flour beetle - ____________________

j. Red Flour beetle - ____________________

k. Meal Worm - ____________________

l. Spider beetle - ____________________

17. Describe the types of sanitary control measures that can be taken for the prevention of stored product pest infestations.

18. Why is ventilation important in the control of stored product pests in a warehouse situation?

19. Explain the procedures for the chemical control of these pests.

CONTROL OF HOUSEHOLD PESTS

OBJECTIVE

Upon completion of this workbook, you will be able to identify the important household pests and to also accomplish the proper control measures for each pest.

1. **The classification of cockroaches is as follows:**

   a. **Class** ______________________________

   b. **Order** ______________________________

2. **Describe the life cycle of cockroaches.**

   ____

   ____

   ____

   ____

3. **Explain why cockroaches are of economic importance.**

   ____

   ____

   ____

   ____

4. **Describe how cockroaches transmit disease.**

   ____

   ____

5. **List the beneficial aspects of roaches.**

   ____

   ____

6. Describe the habits of the following roaches.

   a. American cockroach - ______________________

   ____

   ____

   b. Australian cockroach - ______________________

   ____

   ____

   c. German cockroach - ______________________

   ____

   ____

   d. Brown-banded cockroach - ______________________

   ____

   ____

   e. Oriental cockroach - ______________________

   ____

   ____

   f. Wood cockroach - ______________________

   ____

   ____

7. How can you distinguish between a male and a female Oriental?

____

____

8. What is the most permanent type of control for cockroaches and what steps should be taken in this type of control?

____

____

____

9. **Describe the chemical control procedures for corrective roach control.**

10. **Why do you have to cover a larger area with your chemical when treating for Brown-banded roaches?**

11. **List the accepted chemicals for cockroach control.**

12. **Describe the safety precautions that should be taken during cockroach control operations.**

Crickets

1. **The classification of crickets is as follows:**

   a. **Class** ______

   b. **Order** ______

2. **Describe the life cycle of crickets.**

3. Explain why crickets are of economic importance.

4. Describe the habits of the following crickets.

   a. House cricket -

   b. Field cricket -

   c. Mole cricket -

   d. Camel cricket -

5. Which of these crickets is of most economic importance? Why?

6. Describe the control measures for crickets.

7. Describe the safety precautions that should be taken during the control of crickets.

Ants

1. The classification of ants is as follows:
   a. Class ______
   b. Order ______
2. Describe the life cycle of ants.
3. Explain why ants are of economic importance.
4. Explain why ants are of medical importance.
5. Describe the habits of the following ants.
   a. Harvester ant - ______

b. **House ant -** ______

c. **Fire ant -** ______

d. **Velvet ant -** ______

e. **Carpenter ant -** ______

6. **Describe the relationship between ants and aphids.**

7. **How can you distinguish between an ant and a termite?**

8. **Describe the procedures for controlling ants outdoors.**

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9. Describe the procedures for controlling ants indoors.

10. List the safety precautions that should be followed and observed during ant control programs.

Earwigs

1. The classification of earwigs is as follows·

   a. Class ______

   b. Order ______

2. Describe the life cycle of earwigs.

3. Explain why earwigs are of economic importance.

4. Describe the general life habits of earwigs.

5. Describe the control procedures for earwigs.

6. List the safety precautions to follow in earwig control.

Bedbugs

1. The classification of bedbugs is as follows:

a. Class

b. Order

2. Describe the life cycle of bedbugs.

3. Explain the importance of bedbugs.

4. Describe the life habits of bedbugs.

5. Describe the control procedures for bedbugs.

6. List the safety precautions for the control of bedbugs.

Firebrats and Silverfish

1. The classification of silverfish and firebrats is as follows:

   a. Class

   b. Order

2. Describe the life cycle of silverfish and firebrats.

3. Explain the economic importance of silverfish and firebrats.

4. Describe the life habits of silverfish.

5. Describe the life habits of firebrats.

6. Describe the control methods for silverfish and firebrats.

7. List the safety precautions to be followed in their control.

GENERAL HOUSEHOLD PEST INFORMATION

1. List some of the other agencies where you might obtain information pertaining to household pests.

2. Describe the collecting procedures for specimen collection when dealing with the following pests.

   a. Cockroaches -

   b. Crickets -

   c. Ants -

   d. Earwigs -

   e. Bedbugs -

   f. Silverfish and firebrats -

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FUMIGATION CLEARANCE TECHNIQUES

OBJECTIVE

Upon completion of this lesson you will be able to properly clear a railcar or a stack under fumigation.

PART I

Complete the following checklist, using applicable sections for the type of fumigation operation being used. Perform the clearance procedures under the guidance of your instructor.

ALUMINUM PHOSPHIDE FUMIGATION CLEARANCE CHECKLIST

1. FACILITY: Building # ________________ DATE CLEARED ________________

2. RAILCAR NO. (IN-TRANSIT FUMIGATION ONLY) ________________________

3. CLEARANCE TEAM:

   a. ________________________

   b. ________________________

4. COMMODITY FUMIGATED:

   a. Nomenclature ________________________________

   b. FSN (if applicable) ________________________________

   c. Contract number ________________________________

   d. Contract item number ________________________________

   e. Manufacturer or assembler ________________________________

   f. Lot number and date of pack ________________________________

   g. Quantity ________________________________

      (1) Weight ____________ lbs.

      (2) Cubic feet

         (a) of stack ____________

         (b) of railcar ____________

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5. DATE AND TIME FUMIGATED: ____________________

6. DATE RECEIVED: (IN-TRANSIT RAILCARS ONLY) ____________________

7. ORIGIN OF SHIPMENT: (IN-TRANSIT FUMIGATION ONLY) ____________________
____

8. FUMIGANT INFORMATION:

a. Name of fumigant used. ____________________

b. Form used: Tablets ____________ Pellets ____________

c. Number of tablets or pellets used. ____________________

9. CLEARANCE INFORMATION:	YES	NO
a. Warning signs are posted and properly completed.	____	____
b. A minimum of 72 hours has elapsed since fumigation was initiated.	____	____
c. Stack Fumigation Only:		
(1) Gas concentration checked while wearing an approved mask.	____	____
(2) After lifting edge of the tarp, gas concentration in the area of stack was less than 50 ppm.	____	____
(3) Gas masks were required to complete the lifting of tarp on all sides.	____	____
(4) Area vacated and ventilated for one hour before tarp was removed.	____	____
(5) Gas concentration after one hour of ventilation was ____________ ppm.		
(6) Additional ventilation was required. If yes, ventilation accomplished for ______ additional hours.	____	____
d. Railcars Only:		
(1) Railcar ventilated for one hour after doors opened before entering.	____	____

	YES	NO
(2) Railcar entered while wearing approved gas mask.		
(3) Gas concentration at time of entering car was below 0.3 ppm.		
(4) Gloves worn when removing residue.		
(5) The number of envelopes used indicated that the fumigant used was adequate for the cubic feet within the railcar. (Number of envelopes X (2 tablets) or (10 pellets) = number of tablets or pellets used.)		
(6) All envelopes used (annotated on warning signs) accounted for.		

NOTE: If there are missing envelopes which cannot be accounted for, contact the entomologist who in turn should contact the Directorate of Subsistence, Defense Personnel Support Center, 2800 S. 20th Street, Philadelphia, Pa. 19101, for advice on disposition of the shipment.

	YES	NO
(7) Provisions of MIL-STD 1486A were followed. If no, indicate below what deviation (s) were noted:		

____

____

____

____

____

NOTE: Any deviation from MIL-STD 1486A must be reported to the receiving unit for reporting as a nonconformance.

10. RESIDUE DISPOSAL:

	YES	NO
a. Clay residue mixed with liquid detergent in a bucket of water.		
b. Residue emulsion, all gloves, empty primary containers (following deactivation with detergent and water), and envelopes (if applicable) were buried in an approved landfill.		

11. **REMARKS:** ______________________________

____

____

____

____

____

____

____

12. **CERTIFICATION:**

I CERTIFY THAT THE ABOVE INFORMATION IS CORRECT, WAS ACTUALLY PERFORMED, AND THAT A FUMIGATION CLEARANCE CHECKLIST WAS COMPLETED.

____
PEST CONTROL (SUPERVISOR)
(OPERATOR)

PART II

1. The sign on a railcar that is being fumigated with aluminum phosphide should contain what information? ______________________________

____

____

2. When clearing a railcar that has been fumigated with aluminum phosphide, the atmospheric concentration of PH_3 must be less than ______________ before permitting re-entry.

3. Why is it important to account for all the envelopes containing aluminum phosphide residue when clearing a railcar? ______________________________

____

____

4. Who should you notify if a fumigated railcar arrives at your installation that has not been prepared in accordance with MIL STN 1486A? ______________________________

5. When fumigating a stack indoors with aluminum phosphide, you should vacate the building at what stage of the operation? ______________________________

6. Where should you dispose of the alumnium phosphide residue upon completion of a fumigation? ______________________________

7. What type detector should be used to check concentration of methyl bromide? ______________________________

8. Areas fumigated with methyl bromide should be areated for at least __________ hours.

9. The safe limit of methyl bromide in atmospheric concentration must be less than __________ ppm to allow re-entry.

10. Why should forced air ventalation be used in clearing an area fumigated with methyl bromide? ______________________________

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CONTROL OF STRUCTURAL PESTS

OBJECTIVE

Upon completion of this workbook, you will be able to identify the various types of structural pests and their characteristics, and you will be able to perform the control measures for these pests.

1. The classification of termites is as follows:

   a. Class ____________________________

   b. Order ____________________________

2. Describe the life cycle of termites.

Subterranean Termites

1. List the characteristics and habits of the following castes of the subterranean termite.

   a. Primary reproductive - ____________________

   b. Secondary reproductive - ____________________

   c. Soldier - ____________________

   d. Worker - ____________________

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2. Describe how colony development for subterranean termites takes place.

3. List the life requirements for subterranean termites.

4. List the signs of infestation for subterranean termites.

5. Describe and explain the use of a termite shield.

6. Describe the control measures for subterranean termites.

Dry Wood Termites

1. The classification of dry wood termites is as follows:

   a. Class ____________________

   b. Order ____________________

2. List the characteristics and habits of the following castes of dry wood termites.

   a. Reproductive - ____________________

   b. Soldiers - ____________________

   c. Workers - ____________________

3. Describe colony formation in the case of dry wood termites.

4. List the signs of infestation for dry wood termites.

5. Describe the control measures for dry wood termites.

Powder Post Beetles

1. The classification of the powder post beetles is as follows:

   a. Class

   b. Order

2. Give the habits and characteristics of the following powder post beetles:

   a. Lyctus beetle (family: lyctidae) -

   b. Bostrichid beetle (family: bostrichidae) -

   c. Anobiid beetle (family: anobiidae) -

d. Spider beetle (family: ptinidae) - ______

3. Describe the life cycle of the powder post beetles.

4. List the signs of infestation for the powder post beetles.

5. Describe the control measures for the powder post beetles.

Powder Post Borers

1. The classification of the powder post borers is as follows:

   a. Class ______

   b. Order ______

2. Give the habits and characteristics of the following powder post borers:

a. Long-horned wood borers (family: cerambycidae) - ______________________

____

____

____

____

round-headed wood borers (larva) - ______________________

____

____

____

____

b. Metallic wood borers (family: buprestidae) - ______________________

____

____

____

____

flat-headed wood borers (larva) - ______________________

____

____

____

3. Describe the life cycle of the powder post borers.

____

____

____

4. List the signs of infestation for the powder post borers.

____

____

____

5. Describe the control measures for the powder post borers.

____

____

____

____

____

Bark Beetles

1. The classification of the bark beetles is as follows:

   a. Class ________________________________

   b. Order ________________________________

2. Describe the general habits and characteristics of the bark beetles.

____

____

____

____

____

3. Some common members of the bark beetle group are:

   a. ____________________ b. ____________________

   c. ____________________ d. ____________________

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4. Describe the life cycle of the bark beetles.

5. List the signs of infestation for the bark beetles.

6. What is the major importance of the bark beetles?

7. Describe the control measures for the bark beetles.

Carpenter Ants

1. The classification of carpenter ants is as follows:

   a. Class ______

   b. Order ______

2. Describe the life cycle of carpenter ants.

3. Why are carpenter ants important as structural pests?

4. Describe the control measures for carpenter ants.

Carpenter Bees

1. The classification of carpenter bees is as follows:

   a. Class __________

   b. Order __________

2. Describe the life cycle of carpenter bees.

3. List the types of structures attacked by carpenter bees.

4. Describe the control measures for carpenter bees.

Fungi

1. Fungi can be defined as:

2. Describe the effects of the following types of fungi.

   a. Molds -

   b. Stains -

   c. Decay fungi -

   d. White rot -

   e. Brown rot -

3. Describe the life cycle of fungi.

4. What is the one life essential that fungi must have in order to survive?

____

5. What is the primary method of control for fungi?

____

____

6. What chemical can be used for the control of fungi?

____

ASSESSING STRUCTURAL PEST DAMAGE

OBJECTIVE

Upon completion of this workbook lesson, you will be able to identify structural damage caused by the various types of structural pests, conduct an inspection of a structure, and enter the results on DD Form 1070, Termite and Wood Decay Inspection.

1. List the indications of structural pest damage for the following pests.

   a. Termites

      (1) ______________________________

      (2) ______________________________

      (3) ______________________________

      (4) ______________________________

      (5) ______________________________

      (6) ______________________________

   b. Wood borers

      (1) ______________________________

      (2) ______________________________

      (3) ______________________________

      (4) ______________________________

   c. Fungi

      (1) ______________________________

      ____

      (2) ______________________________

      ____

2. Perform a termite and wood decay inspection on a structure assigned by your instructor.

3. List all infestations and conditions suitable for infestation in the appropriate spaces on the attached DD Form 1070, Termite and Wood Decay Inspection.

4. Consult your instructor for advice on entries pertaining to corrective actions.

TERMITE AND WOOD DECAY INSPECTION

TERMITE AND WOOD DECAY INSPECTION	DATE INSPECTED	BUILDING NUMBER

INSTALLATION	TYPE BUILDING ☐ PERM ☐ TEMP	INSPECTOR

I. FAVORABLE TERMITE AND FUNGI INFESTATION CONDITIONS

☐	WOOD IN CONTACT WITH SOIL	☐	POOR VENTILATION UNDER BUILDING
☐	FORM BOARDS LEFT IN CONCRETE	☐	WATER COLLECTIONS UNDER BUILDING
☐	WOOD MEMBERS SET IN CONCRETE FLOOR	☐	VINES AND SHRUBS AGAINST BUILDING
☐	WOOD STEPS IN CONTACT WITH SOIL	☐	LEAKY PLUMBING IN BUILDING
☐	WOOD STEPS WITHOUT SHIELDS	☐	WOOD SCRAP PILED UNDER BUILDING
☐	WOOD SIDING IN CONTACT WITH SOIL	☐	LOOSE WIRE IN CONTACT WITH SOIL
☐	PIPES IN CONTACT WITH SOIL AND WOOD	OTHER (*Specify*)	
☐	NO SHIELDS ON FOUNDATION		
☐	FAULTY TERMITE SHIELD		

II. LOCATION OF INFESTATIONS

☐	FOUNDATION TIMBERS	☐	BASE BOARDS
☐	WOOD PILLARS	☐	DOOR FRAMES
☐	SILLS	☐	WINDOW FRAMES
☐	CROSS BEAMS	☐	STEPS
☐	FURNITURE	☐	ROOF
☐	FLOOR JOIST	OTHER (*Specify*)	
☐	FLOOR		
☐	STUDS		

III. TYPE OF TERMITE		IV. TYPE OF FUNGI		V. DAMAGE		
☐ SUBTERRANEAN	☐ NONSUBTERRANEAN	☐ WOOD DECAY	☐ WOOD STAINING	☐ STRUCTURAL WEAKENING	☐ SUPERFICIAL	ESTIMATED COST

VI. REPAIR AND TREATMENT

TYPE	RECM	ACCOMP	TYPE	RECM	ACCOMP
REMOVAL OF WOOD FROM SOIL CONTACT			REPAIR OF TERMITE SHIELDS		
SEALING CRACKS IN CONCRETE			REMOVAL OF CONCRETE FORMS		
POINTING UP POOR MORTAR			REMOVAL OF VINES AND SHRUBS		
LOWERING GRADE LEVEL			REMOVAL OF WOOD TRASH		
CAPPING CONCRETE FOUNDATION			OTHER (*Specify*)		
IMPROVING DRAINAGE UNDER BUILDING					
IMPROVING VENTILATION UNDER BUILDING					

VII. CHEMICAL CONTROL

APPLICATION OF POISON DUST TO SHELTER TUBES ☐ YES ☐ NO		CHEMICAL USED		
SOIL POISONING ☐ YES ☐ NO		TRENCH DEPTH	LINEAR FEET	CHEMICAL USED
REPLACEMENT OF DAMAGED WOOD ☐ YES ☐ NO	NO. OF M BD FEET REPLACED	UNTREATED	DIPPED	SOAKED	SPRAYED	PRESSURE TREATED
DRILLING AND FLOODING TREATMENTS ☐ YES ☐ NO		CHEMICAL USED		
WOOD INJECTION FOR DRY WOOD TERMITE ☐ YES ☐ NO		CHEMICAL USED		

VIII. COST

LABOR	MATERIAL	OTHER	TOTAL

IX. TREATMENT EFFECTIVENESS

DATE	REMARKS	INSPECTOR
DATE	REMARKS	INSPECTOR
DATE	REMARKS	INSPECTOR
DATE	TITLE OF INDIVIDUAL EFFECTING REPAIR AND TREATMENT	SIGNATURE

DD FORM 1 FEB 50 1070

GPO 878-568

CONTROL OF HORTICULTURAL PESTS

OBJECTIVE

Upon completion of this workbook, you will be able to identify the important horticultural pests and to also give the control measures for each of these pests.

1. The classification of bagworms is as follows:

    a. Class ______________________________

    b. Order ______________________________

2. Describe the life cycle of bagworms.

____

____

____

____

____

3. Which is the most damaging stage of the bagworm?

____

4. What types of plants are damaged by bagworms?

____

____

5. Describe the method of mechanical control that can be used for bagworm infestations.

____

____

6. Describe the types of chemical control available for bagworms.

____

____

____

____

7. When should a chemical control program be initiated?

____

____

8. List the safety precautions to be followed during a bagworm control program.

____

____

____

Aphids

1. The classification of aphids is as follows:

   a. Class __________________________________

   b. Order __________________________________

2. Describe the life cycle of aphids.

____

____

____

____

____

____

3. What is the reproductive process in aphids called?

____

4. How do aphids damage plants?

____

____

5. Describe the relationship between aphids and ants.

6. Why are aphids of economic importance?

7. List the types of control measures available for aphids.

8. List the safety precautions to be followed when treating for aphids.

Leaf Beetles

1. The classification of leaf beetles is as follows:

   a. Class ______

   b. Order ______

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2. Describe the life cycle of the leaf beetles.

3. List the general identifying characteristics for the leaf beetles.

4. Describe the damage done by each of the damaging stages of the leaf beetles.

5. Describe the control measures for the various leaf beetles.

6. List the safety precautions to be followed during leaf beetle control programs.

Fall Webworm

1. The classification of the fall webworm is as follows:

   a. Class ______________________________

   b. Order ______________________________

2. Describe the life cycle of the fall webworm.

   ____

   ____

   ____

   ____

   ____

3. Which is the damaging stage of the fall webworm?

   ____

4. What types of plants are damaged by the fall webworm?

   ____

   ____

5. Describe the web constructed by the fall webworm.

   ____

   ____

6. Describe the method of mechanical control that can be used for control of fall webworm.

   ____

   ____

   ____

7. Describe the method of chemical control used for fall webworm.

8. List the safety precautions to be followed during fall webworm control operations.

Wood Borers

1. The classification of the wood borers is as follows:
   a. Class ______
   b. Order ______
2. List the two families of wood borers and their members by common name.
   a. Family ______
      (1) Adult ______
      (2) Larva ______
   b. Family ______
      (1) Adult ______
      (2) Larva ______
3. Describe the life cycle of the wood borers.

4. Describe the damage done by wood borers.

5. Describe the mechanical controls that can be used for wood borer infestations.

6. Describe the chemical controls that can be used for wood borer infestations.

TURF AND ORNAMENTAL PESTS

1. List the identifying characteristics of the following pests:

    a. Spider or red mites

    b. Cutworms

        (1) Adults

(2) Larvae

c. Army worms

(1) Larvae

(2) Adults (Army Worm)

(3) Adults (Fall Army Worm)

d. Chinch bugs

(1) Adult

(2) Nymph

e. Grubs

f. Grasshoppers

g. Cicadae

(1) Dog-day

(2) Periodic

h. Snails

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2. List the procedures for controlling the following pests:

a. Spider mites

b. Japanese beetles

c. Cutworms

d. Army worms

e. Grubs

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f. **Chinch bugs**

g. **Grasshoppers**

h. **Cicadae**

i. **Snails**

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VEGETATION CONTROL

OBJECTIVE

Upon completion of this workbook, you will be able to perform vegetation control procedures to include collection and identification of specimens, selection and application of herbicides.

1. Under the direction of your instructor, collect local vegetation specimens.

2. Using commercial and government manuals and identification keys provided by your instructor, identify vegetation specimens and describe the growth habits of each to the instructor. Your description of the growth habits should provide the following data:

   a. Life cycle (annual, semi-annual, or perennial)

   b. Methods of propagation

   c. Habitat (aquatic or terrestrial)

   NOTE: The answers to the following questions will be of great value in preparing you to perform a vegetation control problem. These answers may be found in AFM 91-19, Herbicide Manual for Noncropland Weeds. Commercial texts on these subjects are also available. Consult your instructor if you wish to check out one of these commercial texts.

3. Describe the general modes of action for each of the following:

   a. Soil sterilants

   ____

   ____

   ____

   b. Temporary soil sterilants

   ____

   ____

   ____

c. Selective herbicides

d. Nonselective herbicides

e. Growth retardants

4. Describe the procedures for applying the following herbicides:

   a. 2,4-D

   b. 2, 4, 5-T

c. **2, 4-D and 2, 4, 5-T mixture**

d. **Dalapon**

c. **Simazine**

f. Monuron

g. Diuron

h. Amitrole (Amino-triazole)

i. Methyl bromide

5. List the three general classes of fumigants.

6. List the classifications of herbicides on the basis of their

   a. Use

   b. Mode of action

7. List the precautions to be observed when handling and applying herbicides.

8. The instructor will assign you a problem area upon which you are to perform vegetation control. Fill in the blanks below.

   a. Statement of problem (to be provided by the instructor).